

Off-farm Litter Management and Third-Party Enterprises

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Abstract: To satisfactorily address environmental concerns associated with traditional on-farm litter management practices, the U.S. broiler industry must embrace alternative management practices. Such alternatives will primarily entail movement of large quantities of litter off of production farms. The most promising alternatives for many production regions entail large-scale, off-farm, centralized and regionally coordinated enterprises that process litter into value-added products for sale into commercial markets elsewhere. However, the existing independent contract grower structure is not conducive to the establishment of such large, centralized facilities, which need to be coordinated on a region-wide basis. In many instances, a new mechanism is needed through which poultry producers can collectively pursue such regionally coordinated litter management initiatives. A third-party enterprise could satisfactorily address the various constraints and enable deployment of off-farm litter management options for broiler producers. Such an enterprise could also address liability exposure associated with litter management activities. The most suitable organizational form for a third party “litter bank” would be a nonprofit corporation acting as a litter wholesaler, in which litter ownership and associated liability are transferred from broiler producers to this third party. However, current economic conditions, including immature markets for litter and litter-derived markets, generally preclude the economic feasibility of large-scale, off-farm litter management activities. Thus, market interventions are necessary for deployment of alternative litter management enterprises. A nonprofit litter bank enterprise could readily access and utilize public funds (either for operational support or for market intervention, or both), thereby helping ensure the economic viability of the U.S. broiler industry and lead to a multitude of direct and indirect economic benefits for American agriculture.

This paper was prepared by the Foundation for Organic Resources Management for Winrock International under a Cooperative Development Grant administered by the USDA Rural Development Administration. For more information, contact Annett Pagan, Program Officer-Winrock International, 501-727-5435.

January 2000

Executive Summary

The broiler industry in the United States is characterized by a small number of large and vertically integrated firms that coordinate about ninety five percent of broiler production. The vast majority of broilers in the U.S. are produced under contracts with relatively small, independent farmers.

Although the companies own the birds, the manure belongs to—and is the responsibility and potential liability of—the contract growers. Contracts between an integrator and a grower place environmental liability squarely on the shoulders of the grower, not only in his status as an independent contractor under the agreement, but sometimes through specific contractual terms.

The poultry industry is facing increasing regulatory/social pressures regarding waste management in general and on-farm litter management in particular. Concerns have focused on water quality impacts from non-point sources linked to traditional on-farm litter management practices.

The most promising alternatives for many production regions entail large-scale, off-farm, centralized and regionally coordinated enterprises that process litter into value-added products for sale into commercial markets elsewhere. However, the existing independent contract grower structure is not conducive to the establishment of such large, centralized facilities, which need to be coordinated on a region-wide basis. In many locations around the country, new mechanisms are needed through which poultry producers can collectively pursue such regionally coordinated litter management initiatives.

The challenges of establishing a regionally coordinated litter management system are not to be underestimated. These challenges become more evident in light of the independent nature of poultry growers and their relatively large numbers and small size in comparison to other livestock feeding operators in the beef, swine and dairy industries.

A new mechanism is needed through which poultry producers can collectively pursue such regionally coordinated litter management initiatives. A third party mechanism, such as the “manure banks” that operate in Europe, could effectively address the issues and challenges of litter management in the U.S. Existing clean-out contractors (COCs) could readily be incorporated into such a system. Neither producers nor integrators would be directly involved in handling the litter once it is removed from the poultry house. The separateness of a “litter bank” from direct industry participants will enable it to function with regard to its primary purpose, movement of litter, and *independent of* the business functions of a poultry enterprise. Accordingly, a litter bank would free poultry growers and integrators from taking on yet another task in their already complex management and business portfolio. A litter bank would ideally serve both producers *and* integrators, and would have the ability to work with multiple integrators simultaneously.

Deployment of value-added conversion technologies and marketing of litter-derived products has not occurred in large part because the aggregation/assembly function has not been addressed. Transaction costs for sufficient quantities of litter to make alternatives economically efficient are too high and coordination efforts too onerous to permit development of viable off-farm litter management activities.

The parties currently involved in litter management (growers, integrators, COCs and off-farm users/consumers) have been unsuccessful in addressing the problem/current situation. Their ineffectiveness stems from a variety of sources. Growers and COCs are financially incapable of structuring and maintaining the organization and infrastructure necessary to support a regionally coordinated litter management enterprise such as a litter bank. Moreover, both growers and COCs have developed their farming/business systems around the effective use of poultry litter to produce forage on-farm or on nearby lands (broiler litter has long been viewed as a benefit to the economic well being of the grower). Integrators are reluctant to bear this cost, as the litter is currently, by contract, the property of the grower; moreover, the integrators don't want to incur the significant capital costs and potential liability associated with litter management. Current off-farm users and consumers of the litter do not have the finances nor the infrastructure to deploy a litter bank approach to a large area; therefore, they cannot muster the technology currently available to address the litter management problem. None of the parties is comfortable with the current state of flux in legislation and regulation, as they consider the liability exposure to be an impediment to any meaningful progress in the issue of off-farm management of poultry litter.

Thus, there exists the definite need for a litter bank to address the aggregation/assembly constraint and enable establishment of alternative litter management enterprises to move forward. A litter bank would have two primary operational roles: coordinate and aggregate raw litter, and coordinate (or perform) downstream contracting and subcontracting with handlers, manufacturers, and potentially, end-users of litter/litter products.

A litter bank would provide, at a minimum, either wholesale or brokerage functions to affect coordination and aggregation of the raw litter. The litter bank would serve as a contact point for coordinating clean-out and hauling from poultry houses to other locations and would also manage revised clean-out scheduling among integrators and growers, as necessary.

Coordinating or performing contracting/subcontracting with downstream end-users, handlers and processors would lower transaction costs by streamlining the necessary processes between and among the various parties involved. By performing the vital transfer of ownership function necessary for any market to operate efficiently, the litter bank also addresses the responsibility/liability issue connected with litter and its handling.

The primary legally defined business form options available for a litter bank, include:

1. for-profit entities:
 - a. proprietorships, partnerships and corporations;
 - b. cooperatives and related grower-centered entities and organizations;
2. not-for-profit entities:
 - a. quasi-government entities; and
 - b. nonprofit corporations.

Based upon the general premise that the primary purpose of a litter bank is to move and manage litter “beyond the farm gate,” two overriding criteria will determine which of the organizational options for a litter bank is most suitable: the ability to effectively transfer liability from the producer, and the ability to achieve and maintain financially sound operations.

Regarding the transfer of liability associated with litter management: As of December 1999, nutrient management plans have been developed for many, perhaps most, broiler producers in the United States. For most of the broiler industry, currently litter management practices are based on voluntary implementation of litter (nutrient) management plans developed by federal and state technical assistance agencies. These nutrient management plans (NMPs) are farm-specific (and even field-specific) and provide technical guidance for on-farm management of litter- and manure-derived nutrients. The technical assistance agencies and the research and education community need to evaluate the effectiveness of the various on-farm “best management practices” (BMPs) and recommended conservation practices. It is crucial that these agencies and institutions also explicitly recognize and actively support off-farm management practices in conjunction with traditional on-farm conservation practices and BMPs.

The BMPs set forth in a producer’s NMP entail various specific recommendations for litter management that are designed to avoid environmental impacts associated with the recommended litter management practices. To minimize their liability exposure regarding on-farm litter management, broiler producers should comply with the recommended BMPs set forth in their NMPs. For those broiler operations that are permitted, full compliance will be essential to minimize potential liability associated with on-farm litter management.

Permits addressing water quality and livestock waste application are usually issued based on size of the operation, proximity to bodies of water, or the likelihood that the livestock operation’s activities will constitute a substantial risk of pollution. Due to factors such as average operation size and type of waste management system (i.e., *dry* litter), the current regulatory environment does not apply to most broiler producers. Thus, few, if any, broiler operations are required to obtain state or federal operating permits. However, most states maintain “blanket” regulations prohibiting pollution of the “waters of the state” and retain the authority to permit, regulate, or

otherwise address a broiler operation if its conduct leads to such environmental consequences (including, where applicable, limits on soil phosphorus levels).

Moving the litter off of a production farm could essentially eliminate potential liability associated with on-farm litter management. However, the producer would then be subject to potential liability associated with off-farm litter management activities. A third party litter management entity could reduce—and, in some instances, almost eliminate—potential liability for broiler producers that might be associated with off-farm litter management scenarios (particularly if that enterprise was a wholesaling function that took title to the litter). Thus, a third party litter management enterprise serving in a wholesaling capacity could reduce producers' potential liability associated with both on-farm *and* off-farm litter management activities.

The technical assistance agencies and the research and education community need to evaluate the effectiveness of the various on-farm BMPs and recommended conservation practices. It is crucial that these agencies and institutions also explicitly recognize and actively support off-farm management practices in conjunction with traditional on-farm conservation practices and BMPs.

If one accepts the premise that entrepreneurs will respond to market forces, it is appropriate to assume that if profits were to be made in litter management activities, private for-profit firms would already exist and would be taking advantage of any such opportunities presented. Such is not the case for several reasons:

- ✍✍ The transaction costs of creating the myriad of individual contracts necessary to get litter from numerous small, individual producers are high. At an average of 400 ~ 500 tons of litter per farm per year, a large-scale litter processing operation would need to establish at least several hundred contracts to attain sufficient economies of scale.
- ✍✍ Additional costs necessary to alter current litter management systems, which are land-application based, are substantial. Increased litter export [off of production farms] would entail substantial investments in clean-out, loading, and transport equipment, and potential value-added processing facilities.
- ✍✍ Growers cannot assume the additional costs associated with off-farm litter management because of: limited cash flow; limited access to additional capital; and their inability to recover additional expenses through increased revenues from operations.
- ✍✍ Integrators are unwilling to take responsibility for establishing off-farm management options since they do not own the litter and are reluctant to undertake the additional capital investments and potential liability.
- ✍✍ Long-term supplies of litter are unreliable. Growers can reliably commit litter for only the period of their production contract, which typically is for only one flock or, at most,

one year. Potential processors of litter-derived products are reluctant to invest large sums of money into expensive fixed asset portfolios that rely on unsure supplies of litter.

✍✍ The additional revenue opportunities these value-added products potentially provide will likely not be available for several years, as markets for these products are in their infancy. Therefore, it is not likely that profit-based entities would be willing to operate for long enough periods to be a viable enterprise (and function as a viable litter bank entity).

Given the lack of near- and mid-term economic feasibility of the for-profit and cooperative corporations and the inability to self-fund the litter bank by poultry growers, an infusion of public funds appears to be a desirable interim strategy for establishing and maintaining a litter bank. With appropriate technological and market evolutions, public funds could be gradually weaned away from the litter bank, allowing it to become self-sustaining and perhaps eventually be converted into a for-profit enterprise.

By process of elimination, a nonprofit corporation appears to be the best organizational option for a litter bank under current economic conditions in the United States. A nonprofit corporation is politically acceptable to industry participants, has a history of access to public funds and generally has an acceptable record of integrity in using these funds. Nonprofit corporations are under no compulsion to accrue “returns” to their investments through profit generation. Nonprofits have also traditionally interfaced effectively with a wide spectrum of stakeholders directly and indirectly affected by industry activities. They have served as a focal point for mobilizing and implementing governmental, educational, and community resources, whether fiscal, physical or human-resource based, to address and to solve many complex problems. Finally, the structure of a nonprofit corporation allows relatively easy transition to a for-profit entity when conditions permit.

Within the concept of a litter bank organization formed as a nonprofit organization is the more specific relation of what structure the litter bank will take. Both the electronic and physical banks must facilitate (and, where possible, certify) the export of litter from broiler production operations to other sites, and should also be involved in either coordinating/facilitating existing infrastructure for litter handling or assist in developing additional infrastructure as needed. Potentially, the bank could even interface with existing state and federal agencies to coordinate or provide necessary training for certification that may be required by law for litter handlers.

An electronic litter bank would not be involved in any physical handling of litter and would essentially perform a brokerage function, primarily assisting with litter clean-out and aggregation. The bank would not take possession of the litter nor receive transfer of title of the litter.

A physical litter bank would provide these same services but would also be involved in physical management of the litter, which would entail taking ownership of the material and transferring

liability associated with litter management. Ideally, existing COCs and other existing or newly developed privately held enterprises would provide all these services and the litter bank would augment services (allowing specialization to evolve) or would provide additional service capacity in the event of service shortages. The litter bank could provide new service technologies prior to their widespread deployment in the private sector to encourage their development. Title of the litter could be transferred at numerous points in the physical litter bank to either the bank or to the litter recipients.

Economic aspects of litter bank operations involve the financial health of the enterprise itself and the economic impacts of a litter bank on the surrounding area. Since the economics of a litter bank operation are site-specific, a thorough financial feasibility analysis should be conducted once the exact structure and target location of the litter bank is determined.

It is preferable for a litter bank enterprise to operate under market-driven conditions. Under such conditions, all products, whether raw litter or litter-derived products from value-added manufacturers (VAMs), would have prices that appropriately communicate the product's value to the consumers. But existing markets are immature and current prices for raw litter and litter-derived products are variable and generally do not reflect their full value. Until these markets develop and mature, market interventions will be required to ensure effective deployment of off-farm litter management programs. A litter bank could coordinate with market intervention initiatives or could serve as a conduit for market interventions. A litter bank established as a nonprofit organization could readily access and utilize public funds, either for operational support or for market intervention, or both.

Examples of market interventions include cost-sharing, subsidies, research and technology development, system start-up funds, investment support, and tax credits/incentives. These interventions must be strategically identified and implemented, must effectively address the points in the market for raw litter or litter-derived products where perceived value is not currently reflected at levels sufficient to cover costs or develop markets, and should ideally inject as few distortions as possible into the market system. For example, it would be more economically efficient to utilize subsidies to stimulate demand for litter or litter-derived products rather than subsidize the export of litter off of production facilities.

The injection of public funds could enable healthy private enterprise development to occur and would promote the long-term success of litter bank-supported activities. This is necessary since growers cannot afford to start or operate a litter bank themselves. Similarly, VAMs are unwilling (or unable) to establish a litter bank due to: limited in-house resources (most VAMs are start-up operations); insufficient knowledge of the broiler industry; and/or the high-risk involved in new product/new market development. It would be difficult for a VAM to undertake the litter aggregation function in addition to its manufacturing and market development activities.

The potential economic benefits of litter banks extend beyond their direct impact upon growers. Increased viability of broiler operations will have positive indirect impacts on the nearby and largely rural communities. Creating jobs and infrastructure are important benefits, as is the associated potential for additional industrial development. Utilization and management of litter-derived nutrient resources would also be improved. Nutrients would be more nearly in balance with the needs of the immediate area and allow more extensive use of these resources in distant areas through both raw litter usage and production and distribution of value-added litter products. Moreover, the U.S. broiler industry [including integrator companies] would benefit from enhanced viability of production operations and U.S. grain producers would benefit from continued demand for massive quantities of grains purchased by the broiler industry.

To establish a nonprofit litter bank, several actions need to occur simultaneously:

1. ***Business plan***: A detailed business plan must be developed (refer to section 6.1).
2. ***Broiler industry participation***: The contract growers, the integrators, the industry associations, and other industry participants must voice their support of a litter bank initiative and commit to participate in the establishment and operation of the enterprise.
3. ***Public sector support***: The regulatory and environmental communities (at federal, state, and local levels) must demonstrate their support for the establishment of an off-farm litter management enterprise by giving it a chance to work—by delaying the implementation of new regulations or providing waivers for those who actively participate in the enterprise.
4. ***Funding***: The necessary funds for operations and/or market intervention activities must be secured (refer to section 5.2). Public sector funds will need to be obtained, as will financial support from the poultry industry and other sources (e.g., foundations).

Where possible, the private sector—and, in particular, the poultry industry—needs to embrace off-farm programs that provide litter management options for producers while satisfactorily addressing environmental concerns. In many instances, insufficient markets, liability concerns, and other constraints may preclude pursuit of such programs. In such situations, establishment of a third-party enterprise may enable deployment of off-farm litter management programs.

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1. Introduction

The U.S. broiler industry is characterized by a small number¹ of large and vertically integrated firms² that coordinate about ninety five percent of broiler production in the U.S.³ The vast majority of broilers in the U.S. are raised under contracts with relatively small, independent farmers. Under such an arrangement, broiler growers provide housing, equipment, utilities and labor to raise the broilers (which are owned by the integrators) to pre-specified weights. The integrators provide feed, veterinary services and other supplies. Broiler integrators also own feed mills, hatcheries and slaughter and processing plants. Although the companies own the birds, the manure belongs to—and is the responsibility and potential liability of—the contract growers.⁴ Contracts between the integrator and grower place the environmental liability squarely on the shoulders of the grower, not only in his status as an independent contractor under those agreements, but sometimes through specific contractual terms.

Use of production contracts in the broiler industry increased significantly beginning in 1955 after the large national feed companies moved into broiler-producing areas in the South.⁵ Until the 1950s, most growers were responsible for purchasing their own feedstuffs and marketing their own birds and were therefore constantly exposed to variations in feed and live broiler prices. Broiler contracts have evolved over the years to enable growers to be sheltered to a large extent from the volatility of feed prices and product prices. Accordingly, the growers now shoulder only the management risks associated with broiler production, including fluctuations in interest rates, energy prices and equipment update costs. But, this also means that growers are unable to recover additional production expenses—such as increased costs that may be associated with alternative litter management practices—through conventional product pricing strategies.

The modern broiler industry is recognized by its vertical integration and product differentiation. Vertical integration facilitated rapid adoption of new technologies and improved quality control, product selection and variety and marketing practices. The percentage of market share controlled by the four largest processing firms went from 28 percent in 1980 to 51 percent in 1997. This recent increase is due to improved efficiencies, company buy-outs, mergers, acquisitions, and strategic alliances. Figure 1 shows a schematic of the overall structure of the U.S. broiler industry; additional information is provided in Appendix 1.

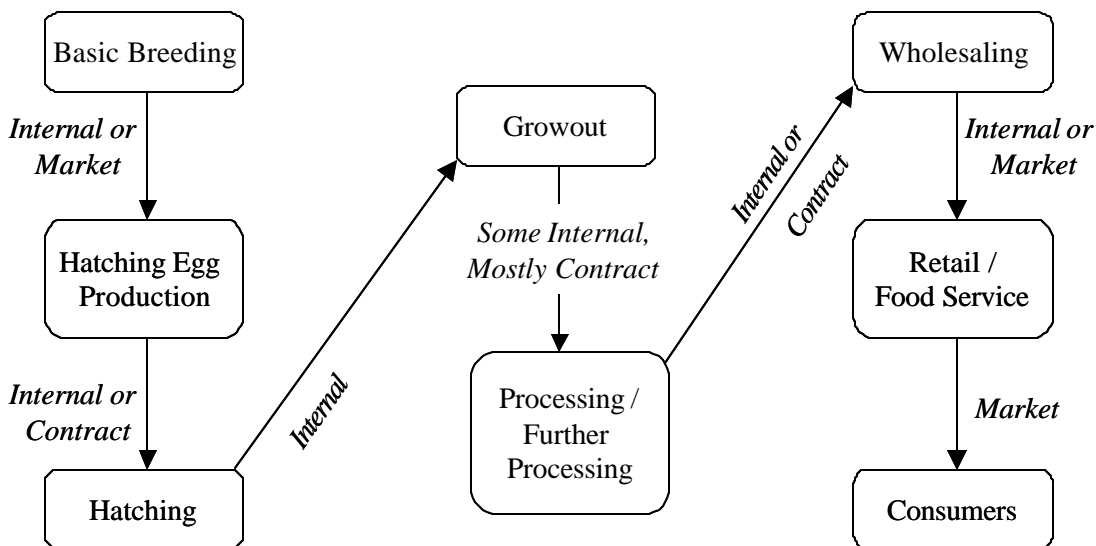
¹ Less than fifty

² Commonly referred to as “integrators”

³ Turkey production is also dominated, to a great degree, by vertically integrated companies and follows essentially the same general production pattern as broilers; however, there are enough differences in the processes so that not all the discussion in this document is directly applicable to the turkey industry. Nonetheless the same issues and concerns with respect to litter production and its subsequent management apply to the turkey industry as to the broiler industry.

⁴ Refer to Appendix 1 for a detailed description of the structure of the poultry industry.

⁵ U.S. broiler production is concentrated in the southeastern region, with Arkansas and Georgia being the two largest producers.

Figure 1: Structure of the Broiler Industry

The economic relationships for each step are shown in italic.

The highly vertically integrated modern U.S. broiler production is comprised of extremely specialized and capital-intensive system components. As indicated in the detailed discussion of the poultry industry structure (see Appendix 1), the numerous production support functions involved in the industry necessitate intensified production in relatively small geographic areas. This results in large numbers of contract growers typically located within fifty miles of a processing facility so that economies of scale and location advantages may be realized. The natural consequence of this broiler concentration is a concentration of poultry litter in and around the production and processing “complex”. Similarly, large applications of poultry litter to area pastures increases litter concentration on non-poultry farm operations.

Total value of broiler sales in the U.S. has increased from 1,014 million USD in 1960 to 19,394 million USD in 1997 (Broiler Industry, 1997). The increase in dollar value of broiler sales reflects the increasing market share of poultry meat relative to beef and pork, largely driven by price competitiveness, convenience and real and perceived product value. For example, during the period 1965 -1996, annual per capita consumption of chicken has increased from just over 30 pounds to 75 pounds; during the same period red meat consumption, particularly beef, decreased from 85 pounds to near 60 pounds per person (USDA-ERS).

Despite steadily increasing broiler consumption and accompanying increases in production, broiler wholesale prices have fluctuated from year to year. Nominal wholesale price volatility resulting from fluctuations in domestic and foreign demand, and the corresponding fluctuations in poultry supply, is the biggest risk facing all industry participants. This price volatility also directly affects grower incomes and state revenues as well as the U.S economy.

1.1 Concerns with Current Litter Management Practices

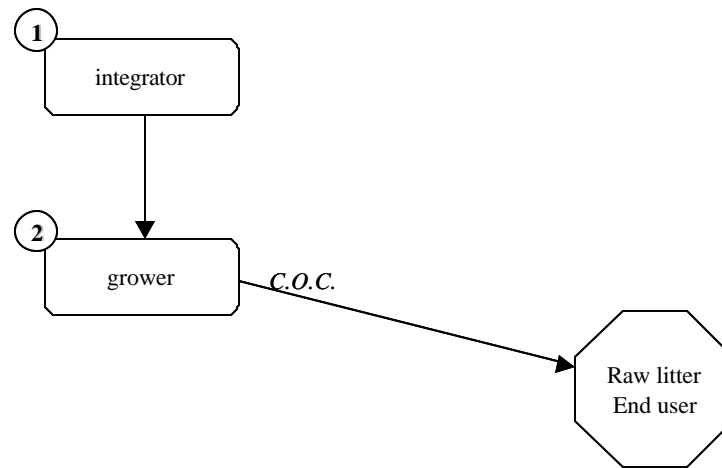
The poultry industry is now facing increasing regulatory and social pressures regarding waste management in general and on-farm litter management in particular. Concerns have focused on water quality impacts from non-point sources associated with traditional on-farm litter management practices.⁶ Many, perhaps most, growers will need to identify and pursue alternative management practices that are technically and economically feasible and environmentally sound.⁷ The most promising alternatives for many production regions entail large-scale, off-farm, centralized and regionally coordinated enterprises that process litter into value-added products for sale into commercial markets elsewhere. However, the existing independent contract grower structure is not conducive to the establishment of such large, centralized facilities, which need to be coordinated on a region-wide basis. A new mechanism is needed through which poultry producers can collectively pursue such regionally coordinated litter management initiatives.

The challenges of establishing a regionally coordinated litter management system are not to be underestimated. These challenges become more evident in light of the independent nature of poultry growers and their relatively large numbers and small size in comparison to other livestock feeding operators in the beef, swine and dairy industries. Over one million tons of litter are generated each year at over 1,000 separate sites in northwest Arkansas alone. These separate sites are typically located on rural roads, many of which are unpaved. Growers traditionally clean out their production houses during a two to three month period in the Spring prior to vigorous pasture growth.

To date, the vast majority of litter clean-out, collection, hauling and spreading functions have been performed by small, local operators referred to as clean-out contractors (COCs). These COCs, utilizing their own equipment, coordinate clean-out with the growers; they either apply the litter to the growers' pastures and hay fields or haul the litter to other pastures in the immediate proximity (typically within five miles) of the production farm for spreading. COCs are also utilized during the year between flocks to remove "cake", the wettest parts of litter in the house, which is commonly removed to improve the production environment. Current litter management activities are predominantly on-farm, as depicted in Figure 2.

⁶ Refer to Appendix 3 for a detailed description of traditional litter management practices.

⁷ Refer to www.organix.org/techinfo.htm for a detailed description of value-added litter conversion technologies.

Figure 2: Flow chart of current litter management activities

*The integrator is considered the “first party”
and the contract grower is considered the “second party.”*

1.2 Utilizing a Third Party Entity for Litter Management

For purposes of the remainder of this paper, a third party enterprise will be defined as any entity of any type other than direct poultry industry participants (e.g. integrator, grower) and will be referred to as a “litter bank.”⁸ Existing COCs could easily be incorporated into such a system, utilizing their expertise and relationships with growers to make operations of the litter bank more customer friendly while simultaneously increasing the efficiency of their existing operations. Neither producers nor integrators would be directly involved in handling the litter once it is removed from the poultry house. The separateness of a litter bank from direct industry participants will enable it to function with regard to its primary purpose, movement of litter, and *independent* of the business functions of a poultry enterprise. Accordingly, the litter bank (LB) will free poultry growers and integrators from taking on yet another task in their already complex management and business portfolio. An LB would ideally work with both producers *and* integrators, and would have the ability to work with multiple integrators simultaneously.

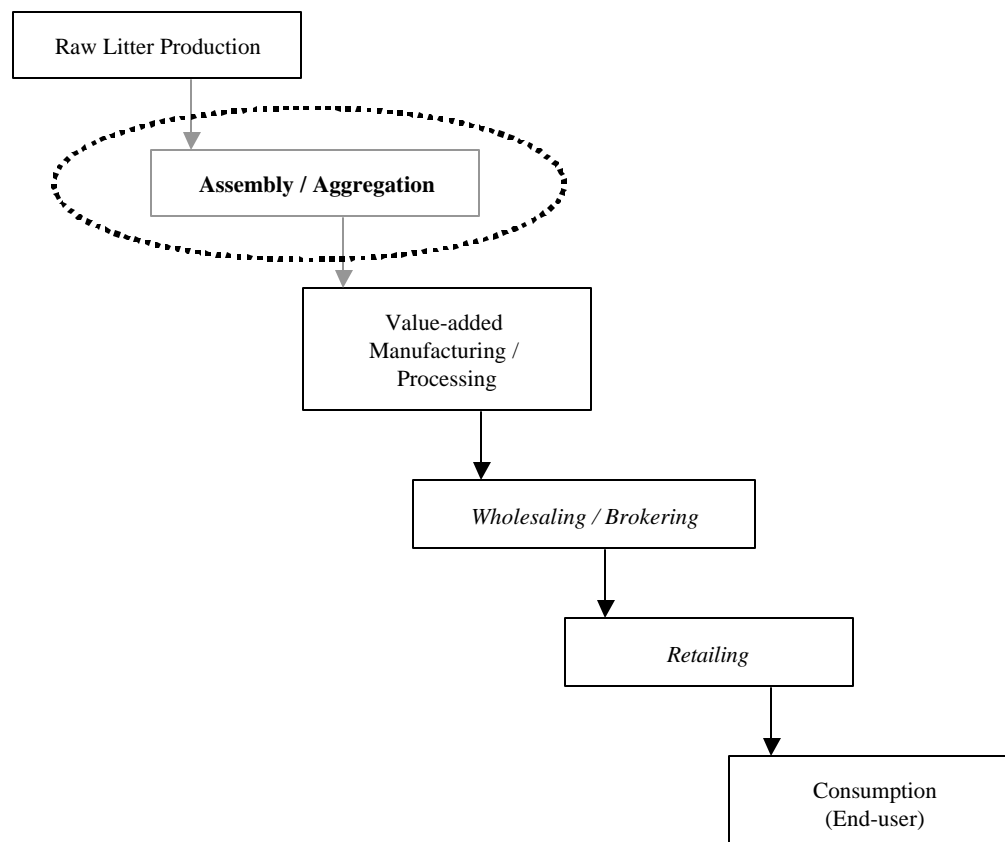
There would be no political or geographical boundaries placed artificially on the LB except those imposed by the type of organization selected or those dictated by sound operation and management of the enterprise. The operational and management activities of litter handling beyond the farm gate would be removed from the growers and integrators. This would result in an entity focused exclusively on litter management and utilization: an enterprise that would be better positioned to efficiently achieve litter management goals while simultaneously helping to stimulate economically sustainable development of litter utilization alternatives.

⁸ The term “litter bank” is used because of the similarity of the enterprise’s objectives and activities relative to the “manure banks” already developed and in use in Europe – refer to section 1.2.

However, a fundamental disconnect currently exists in litter management in the U.S., which is serving as a “show stopper” for establishment of regionally coordinated litter management enterprises. At present, no functional mechanism has emerged in the United States to effectively aggregate litter into sufficient quantities to allow development of economically feasible alternatives to land application. The current situation is depicted in Figure 3.

At the present time, several technologies exist for converting raw litter into value-added products. Soil amendment products could be transported to other areas where the material could be beneficially used and potential markets exist. Energy products could be consumed locally or transported to other markets. Commercial wholesaling and retailing markets could be developed to handle these litter-derived products. However, even where the overall economics of the enterprise appear favorable, deployment of such value-added conversion technologies and marketing of litter-derived products has not occurred because the aggregation/assembly function has not been addressed. Transaction costs for sufficient quantities of litter to make alternatives economically efficient are too high and coordination efforts too onerous to permit development of viable off-farm litter management activities. Thus, there exists the definite need for a litter bank to address the aggregation/assembly function and enable establishment of alternative litter management enterprises to move forward.

Figure 3: Flow chart of off-farm, value-added litter management



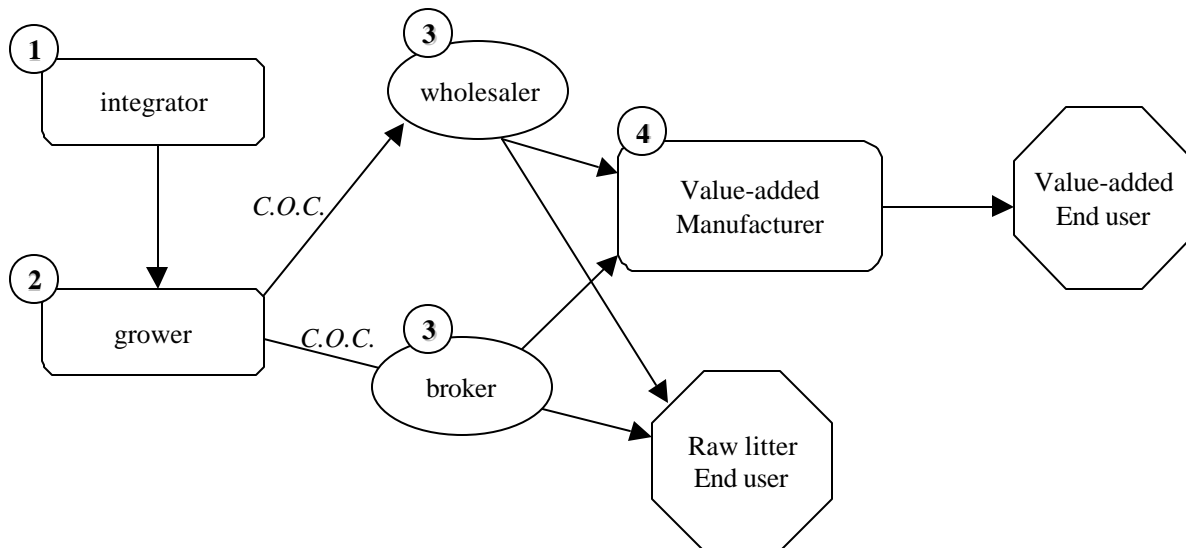
Roles of a Litter Bank

A litter bank would have two primary operational roles:

- 1) coordinate and aggregate raw materials litter, and
- 2) coordinate (or perform) downstream contracting and subcontracting with handlers, manufacturers, and potentially, end-users of litter/litter products.

These roles may be performed in any number of ways based upon the LB's exact scope and organizational type. Detailed discussion of these various scope and type options will be addressed later, but a flow chart representation of a generalized model is helpful at this juncture and appears as Figure 4.

Figure 4: Flow chart for off-farm/alternative litter management



***The wholesaler and/or broker are considered to be third parties;
the value-added manufacturer is considered to be a fourth party.***

Essentially, the LB would provide, at a minimum, either wholesale or brokerage functions to affect coordination and aggregation of the raw litter. The bank would serve as a contact point to coordinate clean-out and hauling from poultry houses to other locations and would also coordinate clean-out scheduling between integrators and growers, as necessary. Similarly, the bank could also coordinate supplies of raw litter to downstream end-users or handlers and processors of raw litter to ensure supplies as needed. Appropriate coordination would enable raw litter to be stored in the poultry houses until needed, thus minimizing the necessity of additional storage facilities through a “just-in-time” inventory system. (This would also help diminish objections that would likely arise to storing large quantities of litter at centrally located storage facilities.)

Coordinating or performing contracting/subcontracting with downstream end-users, handlers and processors would lower transaction costs by streamlining the necessary processes between and among the various parties involved. Participants in the entire marketing channel could have access to the services of the LB so that transfer of title for the litter would pass from party to party as deemed necessary. By performing the vital transfer of ownership function necessary for any market to operate efficiently, the LB also addresses the responsibility/liability issue connected with litter and its handling. Additionally, the LB could act as an agent with multiple downstream clientele (e.g., raw litter markets, composting or pelletizing operations, fuel / energy production) simultaneously, thereby decreasing the inefficiencies of the market.

1.3 Learning from European Experiences

The same major structural changes that are taking place in the U.S. in agriculture in general and animal production in specific are also occurring in many of the European Union member countries. In recent decades, there has been a build-up of intensive animal production facilities and a corresponding heightened concern of the environment. Specifically, the presence of excess nitrogen and phosphate resulting from utilization of animal manures had begun to severely impair certain ground waters and surface waters. The severity of current livestock pollution problems in the EU can be linked to animal density, which has produced the unintended result of nutrient imbalances due to a massive manure surplus in areas of concentrated animal production.

Origins of the problems emanating from the manure surplus are not limited to increased intensity of animal production. A majority of the concentrated production is now accomplished in a non-land based system. That is, there is not enough land associated with current production to effectively utilize the manure. Additionally, the situation has been aggravated by the vast increases in imported nutrients in the form of feedstuffs (recognizing that the nutrients contained in the feedstuffs are originally from commercial fertilizers). In an effort to minimize transportation expenses in Belgium and the Netherlands, much of the increasingly intense animal production is occurring near or adjacent to waterways on which feed mills are located.

Governmental entities have responded by setting limits on nitrogen and phosphates applied to fields and on ammonia volatilization. These restrictions have been established at both the national and EU levels. Similarly, letters of declaration for nutrient application, the so-called “manuring rules,” have also been established. Regarding nitrogen and phosphate limits, specific EU directives have been set, with varying parameters dependent upon season, soil type, proximity to waterways, cropping patterns, and natural conditions. Total limits and limits by source (commercial and manure) exist in most areas, and there are also limits established that are based upon crop type by nutrient source. Failure to comply with EU limits resulted in mandatory reductions in Dutch livestock production by 15 and 10 percent respectively in 1998 and 1999. In Denmark,

laws requiring ownership of sufficient land area to absorb nutrients produced within animal manure have been enacted.

Manuring rules require letters of declaration regarding animal production and resultant manure production and proposed utilization. The somewhat complex manure application guidelines that stipulate timing and amount of application vary from area to area. Additionally, various conservation practices (e.g., stream setbacks, buffer zones and crop coverage selections based upon crop type) are utilized either by mandate or in response to monetary incentives or disincentives.

European policy differentiates between family and commercial animal production operations. All policies are based upon the basic premise that the polluter pays, either through fines for polluting and/or through payments to support off-farm manure management operations. In general, all nutrient policies are area- and source-oriented, thereby allowing specific management practices to be enacted as needed. Some nations, such as Belgium, have compulsory transport and processing rules for animal manure. In the mid-1980's, numerous mechanisms for enabling reasonable compliance with EU nutrient directives were established. These mechanisms will be described and discussed under the rubric of "manure banks."

Manure Banks

European manure banks have evolved in the years since their establishment to provide a variety of services under an assortment of organizational types. Services provided range from electronic tracking of manure movement and "matchmaking" between suppliers and buyers to coordinating manure removal and hauling to physical storage sties. A National Manure Bank was established in the Netherlands by law in 1988 for the purpose of redistributing cattle manure from surplus to deficit areas. Similarly, the Flemish Land Bank was established to coordinate such movement of all animal manure. In 1993, Denmark enacted a national accounting system for nutrients originating from animal manures. The example from the UK is peculiar to poultry litter and is characterized by actual movement of the litter to its end-user. The "national manure banks" in Belgium and the Netherlands and the private manure bank in the UK comprise the following discussions.

The Flemish Land Bank [Vlaamse Landmaatschappij (VL)] is a quasi-governmental entity with powers to regulate manure production, monitor and coordinate manure movements and sale, levy fees based upon manure production and use, and register hauliers and handlers of manure. There are strict guidelines for manure use as fertilizer and for spreading and transport of manure. These vary by municipality and often within municipality, dependent upon specific conditions. Fees are levied by nutrient quantity produced and utilized, with additional charges if producers use the VL for "matchmaking." VL is charged with maintaining so-called "stand-still" levels of phosphates in Flanders and across Belgium and has set and maintained stringent performance –

standards and a complete registry for all those involved with any phase of producing, transporting, or utilizing manure within Belgium.

The Dutch manure banks have a similar construct, except that they operate on a more nearly private basis and often have specialized aggregation mechanisms dependent upon the animal type from which the manure originates. In 1997, 12 “manure banks,” or manure handling factories, were operative and handled a total of 1.25 M tons of animal manure of all types (7,060 tons P_2O_5). There has been considerable turnover in the Dutch manure factories; the total handled has declined from 1.5 M tons of manure (9,960 tons P_2O_5) in 1994. Turnover is partially due to pricing inefficiencies for manure. Initial prices were set too high, resulting in low demand, followed by surplus and low prices, thereby precipitating turnover.

In the case of the U.K., private operators perform the manure bank’s function. These operators contract with specialized hauliers for delivery to power facilities owned by FibroWatt. This operation utilizes only poultry litter to generate power at three locations in the U.K. Intricate scheduling and routing are employed to meet the management needs of the growers and FibroWatt, as well as the desires of the various community stakeholders in collection and delivery areas and delivery routes along the way. An independent agent under contract with FibroWatt is responsible for arranging all producer and haulier contracts and maintaining these same contracts. Proper litter handling during pick up, transport, and delivery is the responsibility of the haulier. The litter is the property of FibroWatt upon pick-up at producer operations.⁹

⁹ The private sector’s ability to step in and provide the aggregation/assembly functions in the U.K. situation was dependent on the unique economic situation in that country. First, the market prices for the litter-derived product—electricity—is substantially greater in the U.K. than in the U.S. (i.e., an average of \$ [redacted] per kwh [wholesale] vs. \$ [redacted] per kwh in the U.S.). Second, financial support programs were established by the U.K. government to support operational costs of the processing facilities. The combination of high energy-product prices and external financial support enabled the project to move forward and provide new off-farm management options for almost half of all poultry litter generated within the U.K.

2. Identifying Organizational Options for a Litter Bank

A variety of organizational options or business forms exist through which a Litter Bank (LB) can be established and operated. There are some basic considerations that must be contemplated in deciding on the form of business to be employed. Most individuals or groups of individuals engaged in farming or agricultural-related activities choose the form of their business from a certain number of selections, some of which will be applicable to the LB enterprise, some of which will not. Considerations which come into play when choosing a particular form include: profit motivation; income-tax considerations; self-employment and social security implications; planning, management and control issues; liability exposure; liquidation issues and the like. The various business form options fall into two broad categories: for-profit or not-for-profit entities. General characteristics of the various options shown below are presented in the following sections.

~~2.1~~ For-Profit Entities

?? Sole proprietorships

?? Partnerships

~~2.1.1~~ Joint Ventures

~~2.1.2~~ General Partnerships

~~2.1.3~~ Limited Partnerships

~~2.1.4~~ Limited Liability Partnerships and Limited Liability Companies

?? Corporations

?? Business Trusts

?? Agricultural Cooperatives

~~2.2~~ Not-for-Profit Entities

?? Quasi-Governmental Entity

?? Nonprofit Corporations

2.1 For-Profit Entities

A. *Sole proprietorships*

A sole proprietorship is a business owned by a single individual. The sole proprietor can engage employees to carry out the business but retains personally the profits and assumes the losses of the business. The owner has direct ownership of the assets of the business; the personal assets of the owner are at risk for the business debts and the business assets are at risk for the owner's personal debts. The owner is at risk vicariously for the acts of the employees of the business.

B. *Partnerships*

B1. Joint Ventures

Joint ventures are voluntary associations of individuals and/or corporations to carry out a single business venture. Although a joint venture is usually considered a partnership, especially if the

profits are shared, this will depend on the facts and the relevant state law. For purposes of the IRS, joint ventures are considered partnerships. Normally joint ventures are used when the parties wish to associate for a single purpose without an on-going relationship. Liability is usually joint and several and unlimited; the owners' personal assets are at risk for business debts and the business assets are at risk for personal debts. Contracting to limit liability may or may not be effective, depending on whether the venture is deemed a partnership.

B2. General Partnerships

A general partnership is an association of two or more persons who as co-owners conduct a business for profit. Partners in a general partnership are liable for partnership obligations to the full extent of their personal as well as business assets. Partners must generally be persons with the legal capacity to act as partners. A general partnership can be formed orally by agreement of the parties or by a course of conduct. A formal written partnership agreement is not required. For tax purposes a partnership is not taxed as a separate entity but passes through tax obligations to its partners. The partners' personal assets are at risk for the business debts, and the business assets are at risk for personal debts. A "silent partner" is still subject to joint and several liability. Normally, distributions from the partnership are based on the partner's share and the entity has state pass-through entity tax treatment.

Depending on the applicable state law, all partners may be liable jointly and severally for everything chargeable to the partnership where: a) a loss or injury is caused to a third party or a penalty is incurred by a wrongful act or omission of any partner acting in the ordinary course of business, b) one partner acting within the scope of his authority receives money or property and misapplies it when in the custody of the partner, and c) where the partnership in the ordinary course of business receives money or property of a third person and misapplies it while in the partnership's custody.

B3. Limited Partnerships

A limited partnership is a partnership formed by two or more persons having the capacity to act as partners and its members include at least one general partner and one limited partner. A general partner has the same liabilities as a partner in a general partnership. A limited partner is a partner whose liability for partnership obligations is limited to the sum of his capital contribution to the partnership plus certain distributions made by the partnership to the limited partner. To preserve limited liability, a limited partner may not participate in the control or management of the partnership's business.

A limited partnership is a creature of statute, and is not formed unless the statutory requirements for organization are satisfied. Failure to observe appropriate formalities may result instead in formation of a general partnership with general liability for its participants. Like a general part-

nership, a limited partnership is a conduit for tax purposes. Unlimited liability for general partners and limited liability for limited partners is the rule, as long as the day-to-day involvement is restricted and not contracted away, although this may differ under various state laws.

B4. Limited Liability Partnerships and Limited Liability Companies

Normally, a limited liability partnership is one in which joint ownership of the business entity occurs. The partnership registers and files all necessary reports with the state. State-to-state reporting requirements differ. Most states indicate “a partner is not liable for the debts, obligations, or other liabilities of either the partnership or another partner arising from another partner’s negligence or that of an employee, an agent or a representative, wrongful acts, errors, omissions or misconduct committed while the partnership is a registered entity occurring in the course of the partnership’s business.” Immunity from liability also applies whether or not the act or omission is intentional or characterized as a tort, contract, or otherwise and applies regardless of whether the innocent partner is asked to cover the liability, such as through indemnification.

An LLP partner will still be liable for his own negligence or other wrongful acts and tax liabilities specifically imposed by applicable tax laws. An LLP partner is not a proper party to an action against an LLP with respect to any debt, obligation or other liability unless that partner is personally liable. Immunity from liability applies even after dissolution or death of a partner.

Limited liability companies (LLCs) are non-corporate, non-partnership entities that permit both limited liability and pass-through of tax benefits for active participants without the limitations on participants required of S corporations. Registered limited liability partnerships afford limited liability even to their general partners. The LLC entity can be in sole or joint ownership. Taxation occurs as either a sole proprietorship or as a partnership. Limited liability applies unless it is contracted away, for example through a lending agreement, which may require signatures in individual and company capacities.

C. Corporations

A corporation is a separate, incorporated legal entity organized under state law. Under most state law a corporation formed for the purpose of carrying on a business for profit may be a business corporation or a professional corporation.¹⁰ In addition, corporations may be formed for purposes other than business for profit. These include entities established for civic, educational, charitable or religious purposes; social clubs; chambers of commerce or business leagues; and entities established for other purposes.¹¹

¹⁰ Certain specialized corporations such as banks, insurance companies and utilities, may be formed under state law.

¹¹ For federal tax purposes, depending on its organizational structure and the nature of its stockholders, a corporation may be a C corporation, separately taxed on its own taxable income, or may elect to be treated as an S corpora-

Sub-chapter S corporations are either sole or joint ownership—this again being governed by state law. Internal Revenue Code regulations dictate the restrictions on ownership and timing of election for tax treatment as a Sub-chapter S corporation. Limited liability for obligations of the corporation applies, unless the corporate veil has been pierced, the shareholders contract away the protections (such as co-signing a note as an individual), or where the shareholders or directors are responsible for obligations of the corporation under state law.

D. Business Trusts

A business trust is an unincorporated business association created by a trust instrument in which property is held and managed by a trustee or trustees for the benefit of the holders ("shareholders") of transferable shares that represent the shareholders' beneficial ownership in the trust estate. A business trust may be a hybrid, sharing some of the characteristics of a corporation, a limited partnership and a trust. For example, interests in a business trust may be evidenced by certificates that are like the shares of stock of a corporation and that are transferable in the same manner as stock certificates. The shareholders of a business trust, like the limited partners of a limited partnership, enjoy limited liability only so long as they do not participate in the management of the business. Finally, the instrument creating the business trust should generally be executed to conform to the law of trusts. Advantages of this business form include centralized management, capacity to have many participants, and the ability to transfer beneficial interests without affecting the continuity of the business. State statute or case law may limit liability.

E. Agricultural Cooperatives

Agricultural cooperatives are unique entities, formed to provide producers with a means of strengthening their economic positions, organizing to provide services to their members, and providing marketing services or supplying the farmer with needed commodities at lower costs. Cooperatives characteristically operate at cost, provide a limited return on investment, exercise democratic control by the members, and offer members participation in net margins on the basis of patronage of the cooperative.

The government's attitude toward the cooperative at both the state and federal level is reflected in specialized state incorporation statutes, unique federal income tax deductions, partial antitrust exemptions, and judicial recognition of the unique nature of the cooperative enterprise.

Cooperatives have a number of characteristics that distinguish them from other business organizations. A cooperative provides services to its members at cost, and its earnings may be returned to the patron as patronage dividends. The board of directors determines how much of the net earnings

tion. By electing S status, the stockholders of the S corporation pass through the income, gains, losses, deductions and credits of the corporation and report them as their own on individual tax returns.

to allocate as patronage dividends. Any earnings not allocated are retained by the cooperative as unallocated reserves. Funds that are allocated to the patrons as patronage dividends may qualify for special tax treatment under Subchapter T. Such funds would not be taxed to the cooperative. Rather, each patron must report the allocated funds as income, even though the patron has not received the funds, has no right to the immediate receipt of the funds, and may not have any idea when payment will be made. Thus, the earnings are not taxed twice as they would be with a regular corporate form of business.

A cooperative is member-owned through membership stock or membership certificates. The members control the cooperative. Each member usually has one vote regardless of the membership stock or other monetary interests that the member may have in the cooperative.

Formation of a cooperative to address the organizational requirements of a litter bank might run into a formidable restriction, at least where contract growers are concerned, due to their limited access to credit for necessary start-up costs of this type of enterprise. In addition, there could also be limited access to non-financial resources (such as management expertise) necessary to organize or operate such an entity.

The entities discussed above constitute the many forms of business entity an agriculture-related enterprise might consider within the for-profit framework. A for-profit enterprise is ideally the approach for most start-up business entities, but in determining the proper business organization tool, the economics of the enterprise should definitely be examined, as should the tax treatment for that type of business. From a business perspective, other issues that should be analyzed include the ease and flexibility of management through the entity of choice, and the reporting or other state or federal requirements associated with establishing and maintaining the entity. From the perspective of a litter management enterprise, additional issues that need to be assessed include treatment of liability vis-à-vis environmental concerns, acceptability of the enterprise type to the critical stakeholders, and the ability of the enterprise to obtain and utilize economic support from public sector sources.

2.2 Not-for-Profit Entities

A. Quasi-Governmental Entity

In light of the European experiences with manure banks, quasi-governmental entities warrant at least an examination in determining the preferred entity type for LB activities. Examples of quasi-governmental entities include the Grand River Dam Authority (Oklahoma), the Tennessee Valley Authority, and others. Federal level entities are numerous, handling a multitude of “public” activities such as postal service and bank examination, through what essentially bears the attributes of both a private enterprise and a governmental agency.

Quasi-governmental entities are creatures of state or federal statute, created by a legislative body in order to address a perceived need within one or more jurisdictions which can best be handled by what is a hybrid of sorts—a public body with private characteristics. A quick examination of the statutes creating the Grand River Dam Authority and the Tennessee Valley Authority reveal characteristics of this type of entity and is presented in Appendix 2.

Quasi-governmental entities are normally close enough in identity to governmental bodies that they take on the attributes of those bureaucracies: “red tape” and slow response to change. Sometimes slow response is a function of the need to address necessary changes in the entity through the legislature, such as in amendments to the enabling statutes of the entity in order to allow some new, developing activity critical to the modernization of the entity to occur.

Liabilities of quasi-governmental entities are addressed in the enabling legislation of the entity through applicable case law in the relevant jurisdiction. Should a quasi-governmental LB be created, a legislative body could decide that the LB entity be immune from any liability stemming from environmental problems caused by the bank activities, such as transportation of litter or human health problems caused by contaminated water close to litter holding areas.

B. Nonprofit Corporations

A nonprofit organization is defined as a corporation in which "no part of the income or profit...is distributed to its members, directors, or officers." All nonprofits share three general characteristics. First, they are specifically designated as "nonprofit" when organized. Second, profits or assets are not divided among members, directors or officers in the manner of corporate shares or dividends. Third, the organization only pursues such purposes as permitted by statute. The motive of the organization is usually the determinative factor in granting the organization nonprofit status.

Organizations which have been found to be proper nonprofit entities include those involved in:

- ✍✍Public-safety, literary and educational purposes;
- ✍✍Natural resources management;
- ✍✍Fostering national or international amateur sports competition;
- ✍✍Specific companies or organizations operated exclusively for the promotion of social welfare;
- ✍✍Labor, agricultural or horticultural organizations;
- ✍✍Credit unions (without stock);
- ✍✍Corporations to finance the ordinary crop operations of agricultural entities.

Many state statutes modeled after comprehensive nonprofit legislation impose requirements that, upon creation, the nonprofit be one of several categories; with somewhat varying rules: 1) public benefit corporations, formed to "perform good works, to benefit society or improve the human

condition"; 2) mutual benefit corporations, formed to "benefit, represent and serve a group of individuals or entities"; and 3) religious corporations, formed "for religious purposes." State statutes regarding nonprofit corporations vary. Thus, it is necessary to consult the specific statutes for each state in which the LB will operate or have activities.

Not-for-profit or nonprofit corporations are generally the equivalent to for-profit corporations, and members in nonprofit corporations stand in the place of shareholders. Like for-profit corporations, nonprofit corporations are legal persons, and members of nonprofit corporations, like their shareholder counterparts, enjoy limited liability for obligations. A board of directors manages both, and both are required to conduct annual meetings of their shareholders or members, as the case may be. The nonprofit corporation may not use income or profits to pay dividends to members or performance bonuses to directors or officers.

The business judgment rule affords directors protection from liability for business judgments so long as the judgment has a plausible basis of rationality, involves no conflicting interest, and is a reasonably informed one. The duty of loyalty also requires each director of the nonprofit to have allegiance to the organization's mission.¹² Tort liability may also be imposed on directors of nonprofits in connection with corporate acts when the director voluntarily or intentionally participates in the act or commits an independent wrong.¹³

Developing areas of liability include liability for environmental hazards. Corporations can be held liable for environmental damage. Even though the corporation is deemed a separate legal entity, it is a fundamental characteristic of corporations that the owners are protected from liability. But these protections have not offered complete protection. The corporate veil may be pierced to impose liability upon corporate actors. Courts continue to go beyond traditional legal doctrines and hold parent corporations, directors and officers and even shareholders liable. Nonprofit corporations are not immune from this growing trend.

Environmental problems have led to the enactment of strict liability statutes in most states. Nonprofits either directly engaged in or with subsidiaries engaged in activity involving toxic/hazardous substances, engaged in the disposal of such substances (e.g., hospitals) or acquiring property where

¹² These duties require the entity to conduct its activities mindful of its public interest. *Attorney General v. Hahnemann Hospital*, 397 Mass. 820, 494 N.E.2d 1011 (1986) ("those who give to a home for abandoned animals do not anticipate a future board amending the charity's purpose to become research vivisectionists". An additional requirement of this duty, which also applies for a business corporation is that directors see to it that the organization conducts its activities lawfully

¹³ Participation in criminal activities or otherwise unlawful acts, even when acting in a corporate capacity may also lead to personal liability. *Veterans Service Club v. Sweeny*, 232 S.W.3d 25 (1952) and *Beale v. Kappa Alpha Order*, 192 Va. 382, 64 S.E.2d 789 (1951).

such activities have taken place, may be liable.¹⁴ Boards may also be liable in employment disputes.¹⁵

Non-profits may carry out their business to protect against tort liability by: a) carrying liability insurance for officers, directors, or other employees; b) accident-cost subsidies as a way to ease the financial burden on nonprofits of acquiring liability insurance; c) exculpatory agreements, releases, or waivers in the form of contracts; and d) statutory protection in the form of:

- (1) indemnification;
- (2) limited liability or partial immunity for nonprofit organizations; or
- (3) immunity from personal liability for volunteers, directors and officers.

In some states, new statutes have been enacted to provide some degree of protection to nonprofits. In others, case law retains some vestiges of the traditional charitable immunity rules. Imposing statutory caps or limits on damages is another avenue states have used to limit tort costs for nonprofits. Appropriate legislative action may be desirable in states where a non-profit option is selected for implementation of a litter bank.

¹⁴ See *Kayser-Roth Corp.* 1990 W.L. 108382, 59 U.S.L.W. 2093 (August 2, 1990) (under the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. § 9613(b) ("CERCLA") corporation liable as owner and operator for clean-up costs of site owned by dissolved subsidiary); *Joslyn Manufacturing Co. v. T.L. James & Co.*, 893 F.2d 80 (5th Cir. 1990) (parent not liable for CERCLA violations by subsidiary absent finding that parent was owner or operator); *U.S. v. Distler*, 58 U.S.L.W. 2555 (W.D. Ky 1990) (successor corporation liable for predecessor's CERCLA clean-up costs); *Kelley v. ARCO Industries Corp.*, 723 F.Supp. 1214 (W.D. Mich. 1989); *Kelley v. Thomas Solvent Company*, 727 F.Supp. 1532 (W.D. Mich. 1989) (officers/directors may be liable under CERCLA as actual owners or operators of a violating facility if they could have prevented or significantly reduced the release of hazardous substance).

¹⁵ See, Tremper and Babrock "The Nonprofit Board's Role in Risk Management: More Than Buying Insurance" National Center for Nonprofit Boards (1990); and for antitrust law violations. (*National Collegiate Athletic Association v. Board of Regents of University of Oklahoma* 468 U.S. 85 104 S. Ct. 2948, 2960 n.22 (1984) ("There is no doubt that the sweeping language of Section 1 [of the Sherman Act] applies to nonprofit entities."))

3. Assessing the Organizational Options Available for a Litter Bank

At this juncture, it is necessary to separate the primary organizational options from specific structural and operational aspects of the eventual LB. The primary organizational form as used herein refers to the legally defined business form of the LB, excluding all particular structural and/or operational aspects (e.g. coordination, hauling, record keeping, contracting, etc.). In review, these primary organizational options include:

3. for-profit entities, including:
 - a. proprietorships, partnerships and corporations;
 - b. cooperatives and related grower-centered entities and organizations;
4. not-for-profit entities, including:
 - a. quasi-government entities; and
 - b. nonprofit corporations.

To better facilitate discussion and assessment based upon the criteria that will determine the eventual organizational form of a litter bank, the four basic options have been grouped into two broad categories: for-profit entities and not-for-profit entities. Each category will be discussed in turn and selection of the organizational option will proceed sequentially in discussion.

Based upon the general premise that the primary purpose of a litter bank is to move and manage litter “beyond the farm gate,” two overriding criteria will determine which of the organizational options for a litter bank is most suitable. These criteria include:

- the ability to effectively transfer liability from the producer, and
- the ability to achieve and maintain financially sound operations.

3.1 Liability Transfer

There is growing concern among both poultry integrators and growers regarding potential liability associated with litter management. Much of this concern results from existing and/or anticipated regulations related to potentially detrimental effects on water quality from current litter management practices at national and state levels.¹⁶ The issue of liability is of particular importance when considering a litter bank’s potential involvement in litter movement, storage and processing at watershed and regional levels (and the potential environmental consequences that could result from these activities). However, in order to assess the ability of various business forms to handle liability it is necessary to first analyze the current situation vis-à-vis environmental responsibilities and compliance.

¹⁶ In particular, concerns have focused on phosphorus run-off from poultry litter applied to fields and pastures.

At present, environmental responsibility associated with litter management is addressed through three avenues:

1. voluntary compliance through implementation of “best management practices;”
2. issuance, where applicable, of permits at state and/or federal levels; and
3. contractual relationships between producers and integrators.

Voluntary compliance: For most of the broiler industry, current litter management practices are based on voluntary implementation of litter (nutrient) management plans developed by federal and state technical assistance agencies. In most instances, the primary incentive for producers’ compliance with these recommendations is the possibility of loss of access to federal/state farm support programs in the event of noncompliance. Also, noncompliance with these recommended management plans may increase the producer’s exposure to possible nuisance lawsuits.

As of December 1999, nutrient management plans have been developed for many, perhaps most, broiler producers in the United States.¹⁷ These nutrient management plans (NMPs) are farm-specific (and even field-specific) and provide technical guidance for on-farm management of litter- and manure-derived nutrients. The plans are designed: 1) to avoid water quality degradation from litter/manure management; 2) are usually developed [at no cost to the producer] by technical assistance agencies (typically at the Conservation District office level); 3) are based primarily on technical guidelines established by the U.S. Department of Agriculture’s Natural Resources Conservation Service (USDA NRCS); and 4) often reflect other conservation practices or “best management practices” established by state or local soil and water conservation departments.¹⁸

The “best management practices” (BMPs) set forth in a producer’s NMP entail various specific recommendations for litter management that are designed to avoid environmental impacts associated with the recommended litter management practices.¹⁹ However, there have been increasing concerns from federal/state regulatory agencies and environmental groups regarding the efficacy of NMPs and BMPs recommended therein. The technical assistance agencies and the research and education community need to evaluate the effectiveness of the various on-farm BMPs and recommended conservation practices. It is crucial that these agencies and institutions also

¹⁷ However, many of these nutrient plans will need to be updated to provide technical guidance for phosphorus management.

¹⁸ Pursuant to the Unified National Strategy for Animal Feeding Operations issued by the USDA and EPA in March 1999 (<http://www.epa.gov/owm/finafost.htm>), the USDA NRCS is now in the process of establishing a revised approach for developing these guidelines, referred to as “Comprehensive Nutrient Management Plans” (“Notice of the Technical Guidance for Developing Comprehensive Nutrient Management Plans,” NRCS, 12/9/99; <http://www.nhq.nrcs.usda.gov/PROGRAMS/ahcwpa/ahCNMP.html>.) The new CNMP process is expected to be in place by mid-2000.

¹⁹ For example, NMPs typically specify recommended application rates (in tons per acre) for litter on each of the farm’s fields, based on soil nutrient levels in those fields and the estimated or analyzed nutrient levels in the litter.

explicitly recognize and actively support off-farm management practices in conjunction with traditional on-farm conservation practices and BMPs.

To minimize their liability exposure regarding on-farm litter management, broiler producers should comply with the recommended BMPs set forth in their NMPs. Regarding potential liability associated with off-farm litter management, the authors are unaware of any producers that have been held responsible or co-liaible [to date] for mismanagement (or perceived mismanagement) of litter by other [off-farm] users. However, the increased focus on litter management that has occurred in recent years may lead to increased liability exposure on the part of producers for situations in which there are environmental impacts resulting from improper litter management by off-farm users—whether by neighbors who buy the litter directly from the producer or by other consumers who purchase the litter from some third party. Even under voluntary litter management conditions, producers should be increasingly concerned about potential liability issues associated with management of poultry litter by off-farm users/consumers.

In light of the foregoing, it is important to identify a third party litter management entity that can minimize—and hopefully eliminate—any potential liability for broiler producers that might be associated with off-farm litter management scenarios. While there are differences in the efficiency of handling the liability issues, all forms of organization are capable of handling liability. Efficiency is more greatly impacted by specific structural and operational mechanisms than by the organizational type itself. For example, a brokerage function may not provide an adequate liability shield for producers, whereas a wholesaling function (in which the third party enterprise takes title to the material) could potentially provide maximum liability shielding for producers.

There has been some discussion within the Environmental Protection Agency that poultry and livestock producers should *always* be a liable party for improperly managed manure/litter, regardless of *who* actually improperly manages the material (or when or where). This “cradle to grave” approach has already been applied to numerous other industries, where the producers of a “waste” material (particularly “hazardous” waste materials) were held liable or co-liaible for remediation and cleanup activities after a pollution event associated with the waste material.

However, the authors consider application of such an approach to livestock and poultry producers unrealistic. For example, it is envisioned that any off-farm value-added processing of litter and subsequent sales of litter-derived products will necessarily entail co-mingling of the raw litter from various broiler farms (in some instances, dozens or even hundreds of different farms could be involved). The co-mingling and subsequent conversion of the litter into another [litter-derived] product would make it almost impossible to track any particular batch of material back to the original source farm (in the event of misuse or accidental mismanagement of the litter-derived products by a transporter, consumer, etc). Thus, larger-scale value-added conversion

schemes offer a greater opportunity for shielding producers against downstream liabilities than other, less sophisticated off-farm litter management options.

Moreover, the authors consider such a “cradle to grave” approach to be fundamentally unacceptable. Under this policy scenario, broiler producers would continue to have full liability exposure, regardless of what they do or how other, off-farm users/handlers manage the litter. Such a scenario would constitute a major disincentive for broiler producers and could lead to some producers exiting the industry—particularly given the existing position of broiler producers as “price takers.”

As noted previously, the authors are unaware of any situations to date in the U.S. in which a broiler producer complying voluntarily with his/her NMP and recommended BMPs has been held liable or co-labile for pollution impacts associated with off-farm litter management by another user/consumer. However, some recent changes in federal and state legislation/regulations may lead to changes in producers’ liability exposure, even under voluntary compliance conditions. For example, in 1998, Oklahoma enacted new legislation (Bill number 1170) that required poultry producers who directly (or indirectly, through clean-out contractors) sold or gave away some of their litter to off-farm users to be responsible for ensuring that the user had obtained and was in compliance with a nutrient management plan (including the nutrients in the poultry litter). In most instances, the burden for compliance with this new regulation has fallen on existing clean-out contractors (COCs) rather than the broiler producers. Several COCs operating in eastern Oklahoma have advised the authors that the new legislation has reduced market demand in some areas...many previous consumers of raw litter (e.g., row crop farmers, forage producers) have not historically obtained soil samples or developed field-specific nutrient management plans and are unwilling to incur the additional effort/cost. In many instances, these previous consumers of raw litter are turning to commercial fertilizer as their sole source of nutrients. COCs have further reported that some previous off-farm consumers of raw litter in the region have reduced or stopped their litter usage because of liability concerns. Apparently, the new legislation has increased the consumers’ awareness/concern that there may be environmental risks and related liabilities associated with litter usage. Thus, an unintended consequence of the new legislation in Oklahoma has been a softening of the already-limited off-farm markets for raw litter in the state.

Permitting: Permits addressing water quality and livestock waste application are issued in most states through state regulatory entities such as departments of environmental quality or agriculture. State regulatory schemes are based on specific enabling state statutes and regulations adopted by the regulatory entity. The state regulatory scheme must operate in conformance with requirements established at the federal level through the Clean Water Act and its implementing

regulations, such as the NPDES requirements.²⁰ NPDES regulations set the floor upon which state regulatory structures must be grounded.

Permits addressing water quality and livestock waste application are usually issued based on size of the operation, proximity to bodies of water, or the likelihood that the livestock operation's activities will constitute a substantial risk of pollution. Livestock operation permits in most states are not currently issued unless the entity is fairly large in size.²¹ Furthermore, the NPDES program is primarily concerned with liquid waste management systems; thus, broiler operations—which utilize dry litter management systems—are generally not considered CAFOs nor required to obtain NPDES permits. However, the EPA is currently planning to modify the NPDES rules to include dry waste management systems such as poultry litter.²² Assuming such changes are enacted, then NPDES permits will be issued only to those broiler producers that meet or exceed the CAFO size threshold (which is expected to equal 100,000 birds, standing inventory). Also note that any such permits would be issued directly to the producer (i.e., the contract grower, not the integrator).²³

Due to factors such as average operation size and type of waste management system (dry litter), the current regulatory environment does not apply to most broiler producers (few, if any, broiler operations are required to obtain state or federal operating permits). However, most states maintain “blanket” regulations prohibiting pollution of the “waters of the state” and retain the authority to permit, regulate, or otherwise address a broiler operation if its conduct leads to such environmental consequences. Other legislative/regulatory actions may directly affect existing broiler operations. For example, several states have established [or are in the process of establishing] specific limits on soil phosphorus levels that are applicable to all poultry and livestock operations. Under such legislation/regulation, these states have the authority to restrict any additional application of litter/manure on those fields that meet or exceed the established soil phosphorus levels. Should violations be found (i.e., producers continue to apply litter on fields that meet or exceed the threshold values), the producer/landowner may become the subject of administrative action or fined for alleged violations. In such an instance a producer would reduce his/her potential liability by pursuing off-farm litter management options. Any third party litter management enterprise that could provide off-farm options for such producers would reduce the producers' liability associated with on-farm litter management. Moreover, as discussed previously, if that enterprise provided a wholesaling function and took title to the litter, then the enterprise would also reduce the producers' potential liability associated with off-farm litter management.

²⁰ National Pollutant Discharge Elimination System (<http://www.epa.gov/owm/npdes.htm>).

²¹ In most instances, a permitted poultry or livestock operation—i.e., a Confined Animal Feeding Operation or “CAFO”—must entail at least 1000 animal units (originally, one animal unit was equal to 1000 pounds of animal; refer to the EPA and the NRCS, respectively, for current definitions of CAFOs and animal units).

²² Refer to the “Draft Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations” (<http://www.epa.gov/owm/afoguide.htm>), EPA, August 1999.

²³ Refer to the subsequent discussion regarding possible “co-permitting.”

Producer-Integrator Relationships: The contractual arrangement between integrators and contract growers regarding litter ownership and responsibility was re-affirmed by the broiler industry through the National Poultry Environmental Dialogue process.²⁴ The industry is now implementing a voluntary framework for litter and poultry waste management that was developed through this process. For example, the industry agreed to abide by nutrient management recommendations and other technical guidance provided by the Natural Resources Conservation Service. Moreover, the integrators agreed to help ensure compliance by contract growers with NRCS recommendations.

Since mid-1998, the integrators have aggressively encouraged their contract growers to obtain and comply with litter/nutrient management plans (developed by NRCS and/or Conservation District staff). In addition, the integrators have supported and even sponsored numerous litter management educational events directed towards contract growers and clean-out contractors. In those instances where contract growers do not adequately participate in these voluntary efforts, the integrators have the option of pursuing additional means to enhance the growers' level of responsible litter management. Under the most severe circumstances, the integrators could conceivably withhold the delivery of chicks to nonparticipating contract growers (which would substantially enhance the economic incentive for voluntary participation).

The potential for integrators to exert such leverage over contract growers has caught the attention of the regulatory community and others who are concerned about potential water quality degradation from traditional litter management practices. Although they acknowledge that litter ownership currently rests with the contract growers, their desire to further engage the integrators in addressing litter management/water quality concerns is based on their belief that:

- a) the integrators have the potential to recoup any additional litter management expenses through product pricing, recognizing that contract growers do not have such options;
- b) the integrators have the resources to initiate or support alternative litter management practices, recognizing that contract growers do not have the necessary resources;
- c) the current contractual arrangements regarding litter ownership are inequitable, and that the integrators should retain ownership and responsibility for the material.²⁵

The Environmental Protection Agency recently announced its intent to implement a “co-permitting” system that would entail issuance of permits to both the integrator and the contract

²⁴ The Dialogue was undertaken between January ~ December 1998; industry participants included integrator companies, industry associations, growers, and farm organizations.

²⁵ Through numerous discussions with contract producers, the authors have concluded that: 1) this perspective is supported by many producers who currently have insufficient land for beneficial use of their litter or who otherwise do not want to use most or all of the material, but that 2) this perspective is not supported by most contract broiler producers, who still view litter as an agronomic resource (refer to Appendix 3) and want to retain ownership of—and realize the economic benefits resulting from on-farm use of—the material.

producer.²⁶ If this regulatory scheme is implemented it would lead to profound changes in the liability exposure levels of both contract growers and integrators. On the surface, it would appear that such sharing of liability for litter management would greatly reduce the potential exposure for contract growers. But what would be the reaction of the integrators if faced with a scenario where they are equally liable for environmental consequences of litter being managed by an independent contract grower with limited resources? Would such co-responsibility/co-liability *without* total management control lead the integrators to take full litter ownership and management responsibility (and even of production operations)? What would the integrators do with the litter? If the litter is removed from the production farm, would there be any compensation for those producers who currently rely on litter as a component of their farming system?

It is unlikely that the integrators would want to directly undertake litter management activities and would seek to identify options for transferring ownership *and liability* for litter management activities. Therefore, if co-permitting were implemented, establishment of third party off-farm litter management enterprises would be even more important. Under such a scenario, the type of organization selected should be capable of taking ownership and responsibility of the litter and providing liability insulation for both producers and integrators.

In reviewing liability transfer considerations, we again note that all forms of organization are capable of handling liability. However, those business forms such as private corporations (either for-profit or nonprofit) that could reduce liability exposure would be more attractive than those forms such as partnerships or cooperatives in which the contract growers and/or integrators would be more active.

3.2 Financial Considerations

For-profit entities: The issue of financially sound operations over an extended period of time is more clearly impacted by the organizational form of the LB. Operation of the LB as a for-profit proprietorship or corporation would likely be more economically efficient than a cooperative, quasi-governmental agency, or nonprofit organization. Management would be simpler and the bureaucracy present in other organizational forms would be minimized. But organized off-farm handling and processing of litter hardly exists...as a fledgling industry, it currently appears to have little opportunity for generating profits in the near-term. In fact, if one accepts the premise that entrepreneurs will respond to market forces, it is appropriate to assume that if profits were to be made in litter management activities, private for-profit firms would already exist and would be taking advantage of any such opportunities presented.

²⁶ for broiler operations with at least 100,000 birds (standing inventory);²⁶ Refer to the "Draft Guidance Manual and Example NPDES Permit for Concentrated Animal Feeding Operations" (<http://www.epa.gov/owm/afoguide.htm>), EPA, August 1999.

Such is not the case for several reasons:

- ✍✍ The transaction costs of creating the myriad of individual contracts necessary to get litter from numerous small, individual producers are high. At an average of 400 ~ 500 tons of litter per farm per year, a large-scale litter processing operation would need to establish at least several hundred contracts to attain sufficient economies of scale.
- ✍✍ Additional costs necessary to alter current litter management systems, which are land-application based, are substantial. Increased litter export [off of production farms] would entail substantial investments in clean-out, loading, and transport equipment, and potential value-added processing facilities.
- ✍✍ Growers cannot assume the additional costs associated with off-farm litter management because of: limited cash flow; limited access to additional capital; and their inability to recover additional expenses through increased revenues from operations.
- ✍✍ Integrators are unwilling to take responsibility for establishing off-farm management options since they do not own the litter and are reluctant to undertake the additional capital investments and potential liability.
- ✍✍ Long-term supplies of litter are unreliable. Growers can reliably commit litter for only the period of their production contract, which typically is for only one flock or, at most, one year. Potential processors of litter-derived products are reluctant to invest large sums of money into expensive fixed asset portfolios that rely on unsure supplies of litter.
- ✍✍ The additional revenue opportunities these value-added products potentially provide will likely not be available for several years, as markets for these products are in their infancy. Therefore, it is not likely that profit-based entities would be willing to operate for long enough periods to be a viable enterprise (and function as a viable litter bank entity).

Cooperatives and related grower-centered organizations are frequently discussed as viable options for fulfilling the litter handling and management function. Co-ops have a rich tradition in U.S. agriculture and fill a vital role in efficient market operation for agricultural commodities and specialty products. Cooperatives are for-profit corporations that return profits to their members in the form of patronage refunds. Profits are generated by sale of products or through provision of services. Marketing orders and commodity organizations often work in concert with co-ops to improve efficiency and augment services provided by the cooperative itself.

In the case of a potential “litter” cooperative, cooperative grain elevators seem to be analogous, where farmers pay a fee for storage and associated services performed by the elevator. There is one important difference, however. Highly organized “ready” markets exist for grain, and the grain is a *primary* product of the farmers’ activities. No such markets currently exist for litter, which is a definite by-product of poultry production. The potential for profit is, again, not present in the near-term. Growers are unable to pay for the costs of LB services given the current

slim margins in poultry production, and integrators have little interest in paying for management of a resource that, by contractual agreement, belongs to the grower. Until such time as [profitable] markets are developed for litter or litter-derived products, it is unlikely that growers or integrators will be interested in pursuing cooperatives for off-farm litter management.

Nonprofit Entities: Given the lack of near- and mid-term economic feasibility of the for-profit and cooperative corporations and the inability to self-fund the LB by poultry growers, an infusion of public funds appears to be a desirable interim strategy for establishing and maintaining a LB. Both the quasi-government and non-profit corporations are readily able to utilize public funds and are customarily viewed by the public as having less self-interest than other organizational forms. With appropriate technological and market evolutions, public funds could be gradually weaned away from the LB, allowing it to become self-sustaining and perhaps eventually be converted into a for-profit enterprise.

Quasi-governmental entities, whether they are established authorities (e.g., Grand River Dam Authority, Tennessee Valley Authority) or “private spin-offs” of federal agencies,²⁷ are inextricably linked to some part of government. They are therefore burdened with bureaucracy and “official status baggage.” In the eyes of direct poultry industry participants, there lurks the specter of regulatory capacity. Whether or not this is well founded is irrelevant, as perception is more often more important than reality. This alone makes the quasi-governmental entity a “no-go” option. Additionally, such entities are relatively inefficient in utilizing their resources and conducting their operations, and would face serious impediments in phasing themselves out once a litter bank could function with less public financial support.

Therefore, by process of elimination, a nonprofit corporation appears to be the best organizational option for a LB under current economic conditions. A nonprofit corporation is politically acceptable to industry participants, has a history of access to public funds and generally has an acceptable record of integrity in using these funds. Nonprofit corporations are under no compulsion to accrue “returns” to their investments through profit generation. Nonprofits have also traditionally interfaced effectively with a wide spectrum of stakeholders indirectly affected by industry activity. They have served as a focal point for mobilizing and implementing governmental, educational, and community resources, whether fiscal, physical or human-resource based, to address and to solve many complex problems. Finally, the structure of a nonprofit corporation allows relatively easy transition to a for-profit entity when conditions permit.

²⁷ e.g., the Alternative Agriculture Research and Commercialization Corporation, which was “lined out” in funding decisions during the FY2000 appropriations process.

4. Structural Considerations in Establishing a Litter Bank

Within the concept of a litter bank organization formed as a nonprofit organization is the more specific relation of what structure the LB will take. Generally, it must be decided whether the bank will be operated as an electronic or physical entity. The Flemish Land Bank (VL) follows the electronic structure while manure banks in the Netherlands and UK are physical banks, to varying degrees. Selection of structure will, by necessity, determine which services and activities the banks perform, with which parties they interface, and the nature and extent of operational aspects the bank must consider.

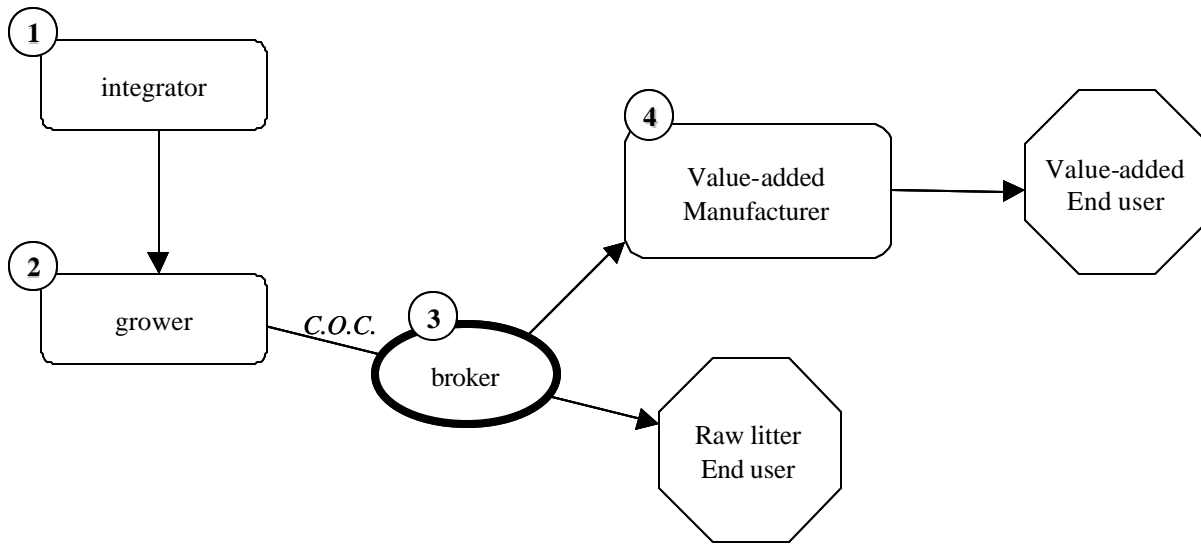
Both the electronic and physical banks must facilitate (and, where possible, certify) the export of litter from broiler production operations to other sites, and should also be involved in either coordinating/facilitating existing infrastructure for litter handling or assist in developing additional infrastructure as needed. Potentially, the bank could even interface with existing state and federal agencies to coordinate or provide necessary training for certification that may be required by law for litter handlers.

4.1 Electronic Structure

The electronic structure could reasonably perform any combination of the following services:

- a. matching buyers of litter with producers/sellers of litter;
- b. arranging and coordinating the timing of poultry house clean-out, and
- c. arranging and coordinating handling of litter to end-users, interim storage facilities, and/or value-added manufacturers.

An electronic bank would not be involved in any physical handling of litter and would essentially perform a brokerage function. The bank would not take possession of the litter nor receive transfer of title of the litter. All operations would be conducted from a centralized location and would be comprised primarily of communication and record keeping. Additionally, the electronic bank would be well suited to act as an incubator for infrastructure and technology development and could be used as an application clearing-house for available governmental funding and as a distribution mechanism for such funds upon their receipt.

Figure 5: Flow chart of litter management utilizing electronic organization

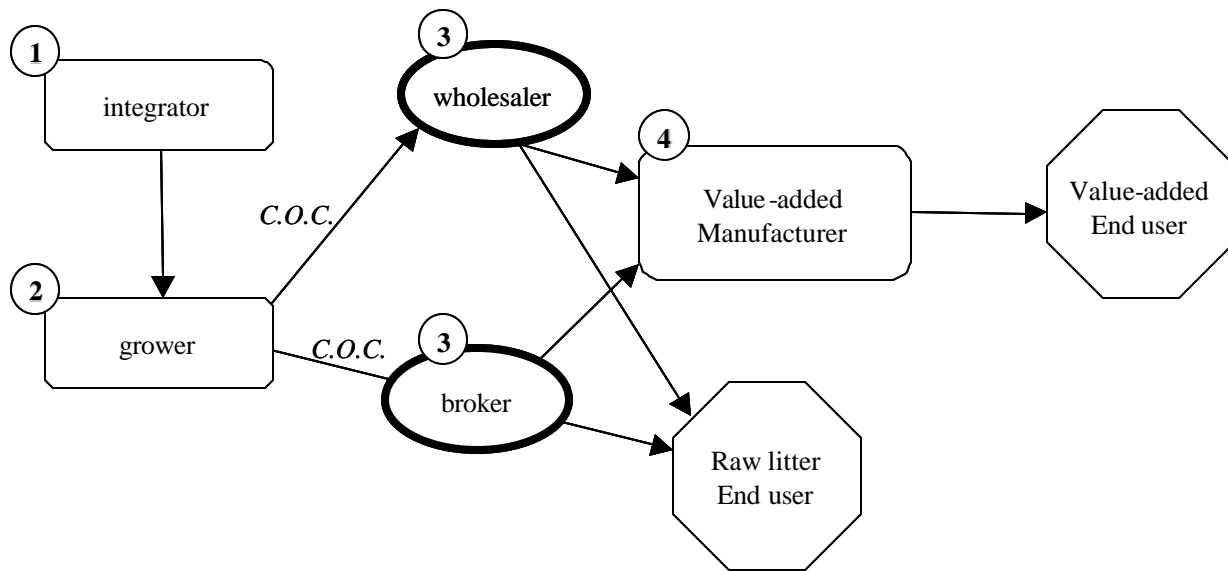
A third party would serve as a litter broker

4.2 Physical Structure

Operational aspects of a physical bank are more numerous and complex than those of an electronic bank. In addition to the three services enumerated above, a physical bank could also perform all or a part of the following services:

- a. clean-out and handling litter away from farms;
- b. operating litter transfer stations during aggregation;
- c. warehousing of litter for delivery to manufacturers and end-users;
- d. delivering litter to manufacturers and end-users,
- e. applying litter to agricultural lands, and
- f. owning and/or operating value-added manufacturing (VAM) facilities employing selected technologies.

Ideally, existing COCs and other existing or newly developed privately held enterprises would provide all these services and the LB would augment services (allowing specialization to evolve) or would provide additional service capacity in the event of service shortages. The LB could provide new service technologies prior to their widespread deployment in the private sector to encourage their development. Title of the litter could be transferred at numerous points in the physical LB to either the bank or to the litter recipients.

Figure 6: Flow chart of litter management utilizing physical organization

A third party would serve as a litter wholesaler and/or broker.

In the context of current operations, the physical structure—clean-out and hauling of litter at the poultry production site—is organized and performed by independent COCs. These COCs own the equipment necessary for clean-out and hauling, but in nearly every case the equipment is well-used, relatively unsophisticated and of small capacity. Bobcats and 6-ton spreader trucks are used as the predominant equipment. This has been adequate to date because litter is typically moved from a poultry house to an adjacent or nearby (within 5 miles) field for land application. With off-farm management becoming increasingly necessary, sizable investment is needed for new, higher capacity front-end loaders, litter augers and transport units for litter movement. A LB could provide such services and equipment, either temporarily during transition to the private sector or longer-term as a supplementary activity to the private sector.

Movement and storage of litter are additional services that could be provided by a bank. As more litter is moved off-farm, the possibility of establishing transfer stations to aggregate litter is an alternative to enable the present litter transport infrastructure to continue operating during a transitional period. Smaller loads of litter could be aggregated for temporary storage and subsequent shipment in larger quantities to manufacturers or directly to end-users in areas distant from litter production. Such aggregation could be performed in areas with particularly high concentrations of poultry production. Aggregating litter could also open up opportunities for back-hauling litter in grain, gravel and sand trucks and train cars to distant litter markets.

The warehousing function for delivery to manufacturers and end-users would allow proper timing of litter delivery to be more easily attained by adding another “slack” point for flexibility. This would obviously require a more complex physical system than previous services with addi-

tional equipment and storage facilities needed. Title of the litter would transfer to the bank in this instance, whereas in the previous two service options it would not be essential that title to the litter would pass to the bank itself.

Delivering litter to manufacturers or end-users and operating a VAM facility would be by far the most complex service options for the LB. The management and capital intensity these options would require seem to make them unlikely choices. Both are better suited for existing or newly formed for-profit entities. But, the bank could provide vital assistance through coordinating the pieces of the market channel and directing publicly available technological and funding assistance to private entities.

5. Operational Aspects of a Litter Bank

Specific operational aspects related to the LB include: 1) logistics, administration and management; and 2) economics of the litter bank itself and secondary economic impacts of the bank's operations.

5.1 Logistics, Administration, and Management

Logistical considerations may be grouped into on-farm and off-farm logistics. On-farm logistics primarily involve scheduling, clean-out and hauling activities. In addition, off-farm logistics involve extensive handling, transportation and facility siting decisions. Regarding on-farm scheduling and clean-out, predominant factors are coordination with flock removal/placement, type of poultry involved, biosecurity, and seasonal considerations.

Historically, houses have been cleaned out in the Spring to coincide with heavy pasture growth periods. Under a scenario of litter movement away from the farm, it is more likely that a constant flow of litter will be required for supplying end-users and/or value-added manufacturing facilities (VAMs) that are distant from the poultry production facilities. Staggered clean-out for growers²⁸ would allow a more steady flow to be established since litter could be "stored" in the production house for several months beyond the usual clean-out period to establish proper litter supply sequencing. The exception would be with breeder flocks, which must be cleaned out between each flock due to biosecurity restrictions. This would not constitute a problem, as breeder litter could be included in sequencing to maintain a proper flow of litter supplies.

Certain on-farm infrastructure limitations have been mentioned previously but are worth reiterating. The current clean-out and hauling infrastructure—typically a bobcat and 6-ton spreader truck—is loosely managed by a number of independent clean-out contractors with severely limited capital. This system evolved to handle litter through land application on local pastures. The current infrastructure is inadequate for moving large quantities of litter for greater distances and requires substantial upgrading, including additions of more efficient front-end loaders and portable augers or ramps to increase clean-out and loading efficiency, and larger trailer trucks for distance hauling. As off-farm litter management enterprises are established, existing litter clean-out contractors are well suited to continue or expand their operations, whether as intermediary subcontractors or as components of the new enterprises.

Off-farm logistics management is primarily a transportation routing and facility siting activity. Routing should be based upon transportation economics and biosecurity considerations. Poten-

²⁸ Staggered clean-out is a process in which different growers would clean out at different times, rather than the current practice of a majority of growers cleaning out in the early Spring.

tial transfer station or warehousing facility sites would be determined based upon available surplus litter density and locations of towns in relation to suitable roadways. For specific farms, access may be restricted to smaller trucks due to the nature of on-farm roads and terrain, thereby impacting routing. In addition, trucks should be dedicated for pickups only on “same company” farms to be consistent with existing biosecurity management practices. Thorough sanitation of all equipment is necessary and the processes should be standardized, as should protocol for hauling off-farm to transfer stations, warehouses, VAMS or end-users. Routing and siting decisions should be determined not only by economic and biosecurity considerations but reflect input from area stakeholders.

5.2 Economics

Economic aspects of LB operations involve the financial health of the enterprise itself and the economic impacts of a LB on the surrounding area. Since the economics of a LB operation are site-specific, a thorough financial feasibility analysis should be conducted once the exact structure and target location of the LB is determined.

It is preferable for a LB enterprise to operate under market-driven conditions. Under such conditions, all products, whether raw litter or litter-derived products from value-added manufacturers (VAMs), would have prices that appropriately communicate the product’s value to the consumers. But existing markets are immature and current prices for raw litter and litter-derived products are variable and generally do not reflect their full value. Until these markets develop and mature, market interventions will be required to ensure effective deployment of off-farm litter management programs. A Litter Bank could coordinate with market intervention initiatives or could serve as a conduit for market interventions. A LB established as a nonprofit organization could readily access and utilize public funds, either for operational support or for market intervention, or both.

Examples of market interventions include cost-sharing, subsidies, research and technology development, system start-up funds, investment support, and tax credits/incentives. These interventions must be strategically identified and implemented, must effectively address the points in the market for raw litter or litter-derived products where perceived value is not currently reflected at levels sufficient to cover costs or develop markets, and should ideally inject as few distortions as possible into the market system. For example, it would be more economically efficient to utilize subsidies to stimulate demand for litter or litter-derived products rather than subsidize the export of litter off of production facilities.

The injection of public funds could enable healthy private enterprise development to occur and would promote the long-term success of LB-supported activities. This is necessary since growers cannot afford to start or operate a LB themselves. Similarly, VAMs are unwilling (or unable) to establish a LB due to limited in-house resources (most VAMs are start-up operations), insuffi-

cient knowledge of the broiler industry, and/or the high-risk involved in new product/new market development. It would be difficult for a VAM to undertake the litter aggregation function in addition to its manufacturing and market development activities.

Economic benefits of LB establishment extend beyond their direct impact upon growers. Increased viability of broiler operations will have positive indirect impacts on the nearby and largely rural communities. Creating jobs and infrastructure are important benefits, as is the associated potential for additional industrial development. Utilization and management of litter-derived nutrient resources would also be improved. Nutrients would be more nearly in balance with the needs of the immediate area and allow more extensive use of these resources in distant areas through both raw litter usage and production and distribution of value-added litter products.

Conceptually, a LB could eventually transition its activities into a for-profit entity driven by market forces. Such possibilities should be understood and reflected in the initial establishment and subsequent operation of a LB.

6. Establishing and Operating a Litter Bank

Establishing a for-profit enterprise to provide off-farm litter management services is potentially a straightforward process. Such an enterprise could simply entail expansion of existing clean-out services. However, in the absence of economic incentives for the establishment of a for-profit enterprise as previously discussed in this paper, establishment of an alternative business form that could access and utilize public supporting funds is likely to be more appropriate in effectively addressing the complex issues involved in off-farm litter management.

More specifically, the establishment of a nonprofit organization that will coordinate off-farm litter management activities for poultry growers in a specific region entails up-front coordination amongst a spectrum of stakeholders, including, in particular, both the growers and the integrator(s) operating in the region. It must be recognized that a nonprofit organization is, technically speaking, a private corporation that must break even financially (i.e., although the organization is a *nonprofit*, that is not to say that it is a “for loss”). Thus, nonprofit organizations must also adhere to sound business principles to ensure fiscal and operational viability.

6.1 Developing a Business Plan

A detailed business plan must be developed for each regional operation. In some cases, it is likely that a separate and unique third party enterprise will be established to provide coordination services for off-farm litter management for a specific region. In other areas, it may be desirable for a single entity to establish branch or satellite operations for each region to be served. In either case, a specific business plan for each region should recognize and take into account the numerous variables that will affect operations in that region. Numerous resources are available to assist with developing these business plans (including federal, state, and local agencies, as well as private consultants and other nonprofit organizations). Such business plans, even for nonprofit organizations, should include the basic components of any good plan for establishing and operating an enterprise (e.g., identification of specific activities, sources of revenues, expenses, product markets, competition, etc.).

However, there is a key difference between the development of a business plan for such a nonprofit enterprise compared to a traditional for-profit venture. Preparation of a business plan requires time and expertise, and therefore represents a cost. For a traditional for-profit venture, there is an expectation that revenues generated through operations will provide an acceptable return for the investment in business plan preparation. Since there cannot be any returns on investments for a nonprofit corporation (i.e., there are no shares and no shareholders), it is impossible for an entrepreneur to recoup his/her investment in business plan preparation for a nonprofit enterprise. Therefore, such situations require either voluntary contributions of time/money by stakeholders or grant funds to engage the professional expertise necessary for business plan development. Although it may be possible in some situations to obtain loans to finance these activi-

ties, such scenarios are considered unlikely because of the added challenges of subsequent debt service.

It is recommended that grant funds be obtained and used to engage professional expertise for the preparation of a business plan for nonprofit organizations intending to provide coordination services for off-farm litter management for a specific region. Voluntary participation in the process by growers who will benefit from the organization will likely be a necessary condition of the grant. Moreover, tangible evidence of support of the integrator(s) serving the specific region (voluntary participation and/or direct cash support) will also be an important component of a successful business plan development process.

6.2 Implementation

Additional funding will be required to initiate operations and ensure fiscal viability of the enterprise. Any enterprise—for-profit, nonprofit, or other organizational type—needs working capital and may also need loans or other sources of debt funding (e.g., development bonds) to underwrite investment in plant and equipment should the organization elect to become involved in the litter management activities discussed thus far. Moreover, given the current lack of economic viability of off-farm litter management options (hence the need for a third party enterprise other than a traditional for-profit), it is likely that additional support will be needed to sustain the services to be provided. The extent of the projected revenues-to-expenses shortfall will be calculated during the feasibility study and business plan development. To the extent needed, sources of external support must be identified and secured prior to implementation.

Management of the nonprofit enterprise could be provided directly (i.e., operational staff would be employees of the enterprise) or could be provided by another organization through a contractual arrangement. Subcontractors for management/administration could include either for-profit enterprises or nonprofit enterprises. However, employee-based management would eliminate potential or perceived conflicts of interest and potentially enhance the confidence level of stakeholders in the organization and the process. In any case, management and administration of the organization must be undertaken by staff having sufficient levels of managerial and administrative expertise *and* “entrepreneurial spirit” to maximize the potential for enterprise’s success.

7. Conclusions

7.1 Why a Third Party Enterprise is Needed

The poultry industry is currently facing increasing regulatory/social pressures regarding waste management in general and on-farm litter management in particular. Concerns have focused on water quality impacts from non-point sources associated with traditional on-farm litter management practices. The existing independent contract grower structure is not conducive to the establishment of large, centralized facilities, which are needed to effectively coordinate litter management on a region-wide basis.

Challenges in establishing a regionally coordinated litter management system are not to be underestimated. These challenges become more evident in light of the independent nature of poultry growers and their relatively large numbers and small size in comparison to other livestock feeding operators in the beef, swine and dairy industries. A new mechanism is needed through which poultry producers can collectively pursue regionally coordinated litter management initiatives.

The parties currently involved in litter management (growers, integrators, COCs and off-farm users/consumers) have been unsuccessful in addressing the problem/current situation. Their ineffectiveness stems from a variety of sources. Growers and COCs are financially incapable of structuring and maintaining the organization and infrastructure necessary to support a regionally coordinated litter management enterprise such as a litter bank. Moreover, both growers and COCs have developed their farming/business systems around the effective use of poultry litter to produce forage on-farm or on nearby lands (broiler litter has long been viewed as a benefit to the economic well being of the grower). Integrators are reluctant to bear this cost, as the litter is currently, by contract, the property of the grower; moreover, the integrators don't want to incur the significant capital costs and potential liability associated with litter management. Current off-farm users and consumers of the litter do not have the finances or the infrastructure to deploy a LB approach to a large area; therefore, they cannot muster the technology currently available to address the litter management problem. None of the parties is comfortable with the current state of flux in legislation and regulation, as they consider the liability exposure to be an impediment to any meaningful progress in the issue of off-farm management of poultry litter.

Formation of a third party enterprise would alleviate several key problem areas in off-farm litter management. The poultry industry is currently under scrutiny regarding their role in contributing to non-point source pollution in run-off from land to which litter has been applied. Establishing a LB would be a good step toward effectively addressing criticisms being leveled upon the poultry industry. A LB would have no entrenched position with regard to litter management, neither politically nor economically, and therefore should be able to operate as an entity largely free from the impediments the current litter management parties face. Similarly, a LB would be able

to work more closely with governmental agencies²⁹ than growers, integrators, COCs or off-farm litter users. Finally, a LB would be uniquely positioned to reflect the needs and desires of all stakeholders, including area residents not involved in litter management, in planning and implementing litter management activities.

7.2 Why a Nonprofit Corporation Makes the Most Sense

Operating on the general premise that a litter bank's primary purpose is to move and manage litter "beyond the farm gate," two overriding criteria will determine which business form will be most suitable for the eventual LB: the ability to effectively transfer liability from the producer, and the ability to achieve and maintain financially sound operations. It is important to identify a third party litter management entity that can minimize—and hopefully eliminate—any potential liability for broiler producers that might be associated with off-farm litter management scenarios. But even on-farm practices could potentially expose contract growers and end-users of poultry litter under certain circumstances. Any third party litter management enterprise that could provide off-farm options for producers would reduce the producers' liability associated with on-farm litter management. Moreover, as discussed previously, if that enterprise provided a wholesaling function and took title to the litter, then the enterprise would also reduce the producers' potential liability associated with off-farm litter management.

If one accepts the premise that entrepreneurs will respond to market forces, it is appropriate to assume that if profits were to be made in litter management activities, private for-profit firms would already exist and would be taking advantage of any such opportunities presented. Such is not the case for several reasons:

- ✍✍ The transaction costs of creating the myriad of individual contracts necessary to get litter from numerous small, individual producers are high.
- ✍✍ Additional costs necessary to alter current litter management systems, which are land-application based, are substantial. Growers cannot assume these additional costs because of limited cash flow; limited access to additional capital; and their inability to recover additional expenses through increased revenues from operations.
- ✍✍ Integrators are unwilling to take responsibility for establishing off-farm management options since they do not own the litter and are reluctant to undertake the additional capital investments and potential liability.
- ✍✍ Long-term supplies of litter are unreliable. Growers can reliably commit litter for only the period of their production contract, which typically is for only one flock or, at most, one year.

²⁹ whether advisory or regulatory, such as NRCS and EPA, respectively

~~✍✍~~The additional revenue opportunities these value-added products potentially provide will likely not be available for several years. Therefore, it is not likely that profit-based entities would be willing to operate for long enough periods to be a viable enterprise.

Given the lack of near- and mid-term economic feasibility of the for-profit and cooperative corporations and the inability to self-fund the LB by poultry growers, an infusion of public funds appears to be a desirable interim strategy for establishing and maintaining a LB.

All potential business forms can protect the growers and industry participants to varying degrees of effectiveness. But not all can successfully address the economic challenges outlined above. Therefore, by process of elimination, a nonprofit corporation appears to be the best organizational option for a LB under current economic conditions. A nonprofit corporation is politically acceptable to industry participants, has a history of access to public funds and generally has an acceptable record of integrity in using these funds. Nonprofit corporations are under no compulsion to accrue “returns” to their investments through profit generation. Nonprofits have also traditionally interfaced effectively with a wide spectrum of stakeholders indirectly affected by industry activity. They have served as a focal point for mobilizing and implementing governmental, educational, and community resources, whether fiscal, physical or human-resource based, to address and to solve many complex problems. Finally, the structure of a nonprofit corporation allows relatively easy transition to a for-profit entity when conditions permit. With appropriate technological and market evolutions, public funds could be gradually weaned away from the LB, allowing it to become self-sustaining and perhaps eventually be converted to a for-profit enterprise.

7.3 Establishing a Nonprofit Litter Management Enterprise

To establish a nonprofit litter bank, several actions need to occur simultaneously:

1. ***Business plan:*** A detailed business plan must be developed (refer to section 6.1).
2. ***Broiler industry participation:*** The contract growers, the integrators, the industry associations, and other industry participants must voice their support of a litter bank initiative and commit to participate in the establishment and operation of the enterprise.
3. ***Public sector support:*** The regulatory and environmental communities (at federal, state, and local levels) must demonstrate their support for the establishment of an off-farm litter management enterprise by giving it a chance to work—by delaying the implementation of new regulations or providing waivers for those who actively participate in the enterprise.
4. ***Funding:*** The necessary funds for operations and/or market intervention activities must be secured (refer to section 5.2). Public sector funds will need to be obtained, as will financial support from the poultry industry and other sources (e.g., foundations).

Appendix 1

Structure of the Broiler Industry in the U.S.

Basic Breeding and Hatching Egg Production

Basic breeding stock is held under extremely tight biosecurity conditions to avoid disease and contamination in these flocks. Breeder companies select and develop their breeds through maintenance of pedigree lines. These lines are selected for improvement based on numerous criteria, including, but not limited to, high rate of gain, feed conversion efficiency, high breast-meat ratio, bone structure, high fertility, resistance to disease, environmental adaptability and reproductive longevity. Further breed development and field trials are conducted through creation of grand-parent flocks. From these grandparent flocks, broiler numbers are increased and parent flocks are developed for placement on contract grower farms utilized by firms separate from the breeder companies that developed the lines or breeds.

Typically, parent flocks are placed on “breeder farms” operated by contract growers. These “breeder farms” will produce either pullets (young females) or breeder hens responsible for production of hatching eggs. In most cases, these hatching eggs are sent to integrator-owned hatcheries to provide broiler chicks for the broiler grow-out phase of production. There are independent companies that also provide broiler chicks to contract growers so that slack is present in the broiler industry.

Traditionally, private companies, not broiler integrators, control basic broiler breeding. In recent years, some integrators have acquired breeding companies that provide a majority of the broiler chicks to the integrator owning the breeding company. This helps ensure a more consistent supply, enables breeds to be developed tailored for the integrators’ production practices and objectives, and may provide additional income through sale of excess broiler parent stock and chicks.

Hatching

Hatching eggs are delivered to hatcheries within 24 hours of production on contract grower operations. Egg pick-up is coordinated and performed by the hatchery where the eggs are incubated. Eggs are held in atmospherically controlled chambers until day 17, when they are often vaccinated *in ovo*. Eggs are moved to hatching chambers at day 18 and remain through day 21, when the chicks emerge. Hatching percentage is usually 80 to 85 percent. Chicks are placed in specialized chick trays and are transported the same day on chick buses to contract broiler producers.

Grow-out

Broiler grow-out may take place over a period of four weeks (for Cornish hens) to eight weeks (for heavy broilers, typically used for de-boning); the majority of broilers have a grow-out period of six weeks. Chicks are “brooded”; for the first several days, chicks are held in small areas (one-half house space or less) under relatively warm temperatures. As chicks develop they are released to full house space and temperatures are gradually decreased to around 75 degrees.

Feed and water are provided through automated systems. Feed is changed twice to coincide with broiler growth stages and is provided by the integrator. Growers receive technical assistance, including any necessary veterinary care, from company service technicians who typically visit each grower once per week during grow-out. Provision of labor, utilities for heating and ventilation, and equipment maintenance and upgrades are the responsibility of the grower.

Once broilers reach the desired weight, the integrator picks up the broilers for delivery to the slaughter facility. Feed and water are withdrawn six to twelve hours prior to slaughter plant arrival to help ensure minimal food safety incidents during processing.

Processing/Further Processing

Broiler slaughter plants are operated by the integrator firms and provide primary processing of broilers into “whole broilers”. Broilers may then be packaged as is or further processed into virtually hundreds of products. Further processing may involve cutting whole broilers into various pieces, filleting, or preparation of marinated, breaded or cooked products. Integrators generally perform further processing but numerous specialty broiler processing firms currently operate facilities used for filleting or production of marinated, breaded or cooked products.

Wholesaling

The integrator usually performs the wholesaling function. Integrators operate fleets of trucks for direct delivery to retail stores, food services, restaurants and fast food outlets. Broiler products are also sold internationally by integrators. Products processed by specialized non-integrator firms may operate their own trucks as well, or may utilize brokerage firms to arrange for sale and delivery of products.

Appendix 2

Additional Comments Regarding Quasi-Governmental and Nonprofit Entities

Quasi-governmental Entities

The Grand River district was created as a governmental agency of the State of Oklahoma. The Grand River Dam Authority (GRDA) has governmental powers and authority to control, store, preserve and distribute the waters of the Grand River and its tributaries for irrigation, power and other uses to aid in reclamation and irrigation of arid, semiarid and other lands needing irrigation, for conservation and development of the forests, minerals, land, water and other resources and for conservation and development of hydroelectric power and other electrical energy in the area.

Generally, the Grand River Dam Authority has the powers mentioned above in addition to the ability to develop and generate water power and electrical power; acquire energy sources; buy, sell, resell and distribute power; and enter into contracts for power supply.

Cases interpreting the GRDA authority indicate its quasi-governmental nature. One case reflected that the GRDA was created by state law as a governmental agency or public corporation with limited powers but was a "corporation" within the meaning of Oklahoma statutes providing that a corporation may be sued in any judicial district in which it is incorporated or licensed to do business or is doing business.³⁰

The Tennessee Valley Authority was created to maintain and operate properties of the United States in the interest of national defense and for agricultural and industrial development, to improve navigation in the Tennessee River and to control the destructive flood waters in the Tennessee River and Mississippi River Basins. The enabling statutes indicate the entity was created as a corporate body with the first board of directors deemed the incorporators and the date of incorporation coinciding with the date of the first meeting of the TVA board. TVA has the right to its corporate name, the right to sue and be sued, adopt a corporate seal, make contracts, purchase or lease real and personal property, exercise the right of eminent domain acquire real estate and construct dams and take actions in the name of the United States.

³⁰ R. S. Mikesell Associates v. Grand River Dam Authority, E.D.Okla.1977, 442 F.Supp. 229

Nonprofit Corporations

State statutes allowing nonprofit entity creation generally mirror the Internal Revenue Code and are usually expansive enough to include, as nonprofit corporations, any entity formed for civic, educational, charitable, benevolent, religious, scientific or similar purposes. Also adopted as non-profit in nature are business enterprises created for:

- ✂✂ Literary, artistic or musical purposes;
- ✂✂ The encouragement of athletic exercises;
- ✂✂ The association of charitable and social bodies;
- ✂✂ The encouragement of agriculture and horticulture;
- ✂✂ The establishment boards of trade and chambers of commerce;
- ✂✂ The improvement of the physical aspects of cities and towns.

Section 501(c)(3) of the Internal Revenue Code (IRC) exempts from federal taxation income of entities organized solely for "religious, charitable, scientific, testing for public safety, literary, or educational purposes", as well as entities organized "to foster national or international amateur sports competition."³¹

Directors of nonprofit corporations are required to observe fiduciary duties to the organization, including the duty of obedience to the purposes of the organization, the duty of loyalty and the duty of due care.³² The duty requires observance of the purposes of the entity expressed in its charter or by-laws and in terms of its actual activities. This might be otherwise known as observance of the “mission” of the nonprofit.

³¹ I.R.C. § 501(c)(3). Subsections 501(c)(4)-(10) also exempt from taxation such entities as civic organizations, labor and agricultural organizations, pension plans, chambers of commerce and fraternal benefit societies. Under the IRC, private foundations are a residual category comprising all exempt organizations under § 501(c)(3) that are not public charities under § 509. Section 509 identifies organizations as public charities on the basis of the nature of their activities—such as religious, educational and medical research organizations—or, alternatively, on the basis of their support. Publicly supported organizations receive at least one-third of their normal support from governmental entities or from the general public. I.R.C. § 509 (1988).

³² *Alco Gravure, Inc. v. The Knapp Foundation*, 64 N.Y.2d 458, 479 N.E.2d 752, 490 N.Y.S.2d 116 (1985); and, *Holt v. College of Osteopathic Physicians*, 40 Cal. Rptr. 244, 394 P.2d 932

Appendix 3

Broiler Litter Management: Traditional Practices

Litter Production: Over 8,000,000 tons of broiler and turkey litter are produced each year through conventional poultry production practices in the United States.^{33, 34} Litter is the result of bedding material³⁵ after it has been placed in the bottom of the production house and served as an absorbent during one or more production cycles.^{36, 37} The frequency of broiler litter clean-out varies. Some growers prefer to clean out after each flock, while others clean out only once every few years.³⁸ Most growers, however, clean out once each year, which means that, for broilers, the litter represents bedding that has absorbed the droppings from about 6 flocks of chickens.

Litter Characteristics: Litter encompasses the original bedding material plus the minerals, ash, organic material, and moisture from the birds' excreta. The characteristics of litter can vary significantly, depending on a variety of factors (e.g., bedding material, the number of flocks before clean-out, the feed rations given to the birds, management styles within the production house, weather and ambient conditions, etc.).

The bedding material usually undergoes some particle size reduction and some biological degradation. The moisture content of litter varies from about 17% to as high as 45%, but is generally in the 20%~25% range. Typically (at least for 6-week and 6 flock/year broiler production in the southeastern United States), the litter is rich with nutrients, calcium (an important liming agent), and trace minerals from the birds' excreta.³⁹ Total nitrogen averages between 2.5% ~ 3%, although much of the nutrient is lost during *in situ* decomposition, clean-out, and subsequent storage and application practices. Phosphorous averages around 1.5% ~ 2%, with essentially all of the nutrients being retained throughout conventional litter management activities. Potassium averages around 1% ~ 2%, and is also conserved throughout conventional litter management activities. The ash content of broiler litter typically averages around 20%~25%.

³³ Based on an analysis of broiler and turkey production data in the '97 Agricultural Census.

³⁴ Primarily through the production of broilers and turkeys, although bedding is also used—and litter is therefore also produced—in many layer operations, particularly “breeder” operations in which eggs are produced for laying hens or chicks for grow-out.

³⁵ typically wood shavings, sawdust, rice hulls, wheat straw, or some combination of these materials.

³⁶ For broilers, the grow-out period in which chicks are raised to market size ranges from 4 to 7 weeks, with an average grow-out period of about 6 weeks.

³⁷ For broilers, production houses are commonly 40 feet wide by 400 feet long, with a production capacity of about 20,000 broilers per flock. The bedding material is commonly applied about 3~4 inches deep throughout the entire house.

³⁸ Most broiler producers also “de-cake” after each flock. Breeder hen and pullet producers also clean out after each flock due to biosecurity issues.

³⁹ Trace minerals include sulfur, magnesium, sodium, iron, manganese, copper, and zinc.

Litter Use: After clean-out, the litter is typically applied directly on to agricultural lands either on or near the poultry production farm.⁴⁰ Application rates vary, but generally range from 2 to 4 tons/acre.⁴¹ Many farmers own and operate their own clean-out equipment. Conversely, many other producers elect to contract out such services to “clean-out contractors” (particularly those producers who have insufficient land to fully utilize their litter for forage/crop production and must therefore rely on neighboring farms and other markets for their litter management activities). Many—perhaps most—poultry producers now have management plans that set forth specific practices for on-farm litter management (with application rates and other “best management practices” often determined on a field-by-field basis). These management plans, generally prepared by the staff from the Conservation District office serving that producer, incorporate technical recommendations from the USDA Natural Resources Conservation Service and the state soil and water conservation agency, and are designed to comply with any existing federal, state, or local regulations regarding litter management.

Almost all of the litter currently produced in the United States is being directly utilized for on-farm or near-farm agronomic purposes as described above. In a few instances, other markets for unprocessed litter have been developed (both near to and distant from the poultry production region). In some areas, as much as 10% of the litter has been used as supplemental cattle feed. A small portion of the litter has been processed into value-added products (e.g., pellets sold as soil amendments, litter as fuel for electrical production).

Environmental Concerns: It is widely recognized that the amount of phosphorus contained in poultry litter and applied to agricultural lands commonly exceeds the amount of phosphorus needed by the agricultural crop. Over time, such continued applications of excess phosphorus leads to accumulations of phosphorus within the soils in the application fields. Recent scientific data indicates that these high soil-phosphorus levels can lead to some water quality degradation, occurring primarily through nonpoint source runoff. Recognizing these potential links, regulatory and social pressures are mounting for litter application rates to be reduced to levels that will minimize such potential runoff and water quality impact events.

Litter as a resource: Poultry litter is an excellent soil amendment and has proven to have significant agronomic value from its nutrients and the organic matter added to the soil through its application.⁴² In many instances, poultry producers have developed entire farming systems that

⁴⁰ Wherever possible, hauling distances of raw litter are kept to a maximum of about ten miles.

⁴¹ The crudeness of litter spreading equipment and various physical constraints (e.g., slope, existing ground cover, etc) limit the precision with which litter can be applied. It is generally considered unrealistic to attempt application rates below 1.5 tons/acre.

⁴² In addition to enhanced soil fertility from the nutrients in litter, other agronomic benefits include liming, improved soil tilth, enhanced water retention capacity, and, indirectly, reduced soil erosion due to the improved vegetative cover resulting from the use of litter on poor and/or highly erodible soils that are common in many broiler production areas.

are now dependent on beneficial utilization of their litter: the litter is spread on pasturelands, which leads to substantially enhanced forage production, which enables relatively high-density cattle production. In this fashion, many poultry producers have also become cattle producers, with cattle production becoming an integral part of the farming system and an essential component of the farm's revenue picture.⁴³

⁴³ To illustrate this point: Benton County, Arkansas, is the third largest poultry producer in the U.S. (in total animal units) and also ranks 17th in beef cattle production *density* in the U.S. (in cattle per farm acre).